


HUMAN ENGINEERING
AND INDUSTRIAL
ECONOMY

LAWRENCE A. HARTLEY



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HUMAN ENGINEERING AND INDUSTRIAL ECONOMY

BY

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PREFACE

The author began his industrial experience at fifteen years of age. His formal educational experience was gained after a considerable period during which his only opportunity for self-improvement was such as was afforded through industrial contacts.

During these years when the desire for information was keen, there were many who served as instructors. Some of these would be considered college failures, for the great crop of students who do not finish college is well represented in our shops and factories. In many instances, these college failures are a blessing to the fact-hungry men in industry. Naturally, some of their information is misleading and much must later be revised. On the whole, however, the discussion in industry is so informal and free from pedantry that impromptu instruction benefits from impartial criticism.

The great school of industry, whose classroom is all the way from the wash room to the noon hour lunch period, is always operating. Whatever may be said of the accuracy of its information, it is certain that there is more discussion of psychology and sociology over the dinner pails of American workmen than in all the colleges of the country. As a boy, the author formed the acquaintance of Herbert Spencer, Carlyle, Milton, James Stuart Mill, Huxley, Voltaire, Rousseau, Goethe, Plutarch, Karl Marx, and William James. There were many others, but these stood out as their special advocates urged them upon him during earnest if interrupted conversations.

One shop professor is remembered with special gratitude. Everyone called him "Bill." As an apprentice, the author enjoyed Bill's discourses on philosophy while helping to adjust brake rigging in a greasy roundhouse pit. These discourses always sent the helper hurrying at night to the secondhand bookstore in search of Socrates or Plato or Jesus. Those were happy days when the pay was small but the opportunity to

learn loomed large and the fraternity of the shops was a vivid reality.

Unquestionably, this shop instruction could have been improved upon both from the standpoint of methods of presentation and teaching content. But in one respect, this early training course was superior. The will to work was acquired through habits of industry. Subsequent observation has led to the conclusion that *education without the will to work is intellectual mockery*.

Years of shop experience as workman and foreman convinced the author that workingmen read more generally and think more specifically than many employers and school men suppose. No greater mistake can be made by those responsible for improving industrial relationships than to underestimate the intelligence and cultural interests of workers and foremen.

As opportunities have been extended, the memory of those early shop years has focussed upon those periods of intense longing for information which could be applied in the trying situations of complex industrial life. For those whose vision is sharpened by experience, there is evidence of eager interest on the part of many intelligent workers and foremen today in the great human questions.

For these, this book is intended to serve as a source book in human relations in industry. Here will be found suggestions for a library in which the student may search for those books he feels he needs in a given situation.

To those instructors who have contributed to the understanding which made this book possible, there is a feeling of profound gratitude. They make up a heterogeneous group of men and women from the shops and schools and colleges. These will share with those earnest employers and workers who seek to promote industrial peace the hope that men who work together shall study together the industrial problems of our times.

L. A. H.

November, 1928

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The desire of the author to present the subject in source book form made necessary requests to many authors and publishers for permission to quote. There are 151 separate quotations from 99 different sources. Most of the material quoted is recent and covered by copyright. The generous response to these requests has been a source of satisfaction. Special acknowledgment of this permission to use material is hereby made to the following: D. Appleton & Company; The Century Co.; Doubleday, Doran and Company; E. P. Dutton & Company; Ginn and Company; Harcourt, Brace and Company; Harper & Brothers; D. C. Heath and Company; Henry Holt and Company; Little, Brown & Company; The Macmillan Company; The Norman Remington Co.; W. W. Norton & Company; G. P. Putnam's Sons; Charles Scribner's Sons; Vanguard Press; The Viking Press; The H. W. Wilson Company; Wm. H. Wise & Co.; American Engineering Council; American Academy of Political and Social Science; Metropolitan Life Insurance Company; Northern Pacific Railroad Company; Teachers College, Columbia University; Roger W. Babson; Thomas Nixon Carver; P. W. Litchfield, President, The Good-year Tire & Rubber Company; B. C. Forbes; William Allen White; Charles Wesley Wood; and Ordway Tead.

Certain topics must be presented objectively if readers are to receive convincing impressions. The Ohio Brass Company of Mansfield, Ohio; and the Delco-Light Company and Frigidaire Corporation of Dayton, Ohio, furnished unusual opportunities for observation of various methods of training and for gaining the assistance of men whose daily responsibilities include the details on which material was being prepared. The subjects on which this assistance was obtained include cost

control, personnel practices, production methods, and foremanship training. In particular, A. D. Lynch, Personnel Superintendent, S. W. Stanyan, Head of Cost and Rate Department, F. A. Klohs, Manufacturing Superintendent, of the Ohio Brass Company; Dr. Harry Myers, Superintendent of Personnel, and Thomas B. Fordham, Manager, Delco-Light Company, contributed to or prepared parts of the manuscript dealing with these practical questions. E. E. Yake, Assistant to the President, Worthington Pump and Machinery Corporation, rendered special assistance through discussion of subject matter and contributions to the manuscript.

C. L. Close, Manager, Bureau of Safety, Sanitation and Welfare, United States Steel Corporation, prepared part and reviewed all of the manuscript of the chapter on "The Relation of Safety First and First Aid to Industrial Economy."

Miss Alice M. Loomis assisted in the organization of the manuscript for publication with reference to its adaption to school use and in critical review of a number of the chapters.

Louis W. Olson, Factory Manager, The Ohio Brass Company, Mansfield, Ohio; Clarence R. Falk, Secretary-Treasurer, The Falk Corporation, Milwaukee, Wisconsin; C. S. Koch, President and General Manager, Fort Pitt Steel Casting Company, McKeesport, Pennsylvania; E. H. Ballard, General Superintendent, Foundries and Pattern Shops, General Electric Company, West Lynn, Massachusetts; and George K. Wilson, Labor Department, Deere and Company, Moline, Illinois, as members of a Committee on Industrial Education, of which Dr. Harry Myers is also a member, have been especially helpful by facilitating observation of plant practices and in reviewing the manuscript.

Professor Frederick S. Deibler, Department of Economics, Northwestern University, reviewed the manuscript for scientific accuracy. His detailed criticism was carefully observed. Grateful acknowledgment is made of this critical review, without which the author would have hesitated to release the book. In many instances, the author made use of Professor Deibler's statements in revising manuscript to conform with his review.

Dr. John M. Brewer, Director, Bureau of Vocational Guidance, Harvard University, offered helpful suggestions concerning the use of topical headings. Subsequent reviews have shown the wisdom of Dr. Brewer's criticism, and the author is convinced that the topical headings employed have added much to the usefulness of the book.

The following industrial concerns and companies assisted by furnishing either illustrative material or information: International Harvester Company, J. I. Case Threshing Machine Company, Allis-Chalmers Manufacturing Company, United Engineering Company, General Motors Corporation, Ford Motor Company, United States Steel Corporation, Bethlehem Steel Company, Eastman Kodak Company, General Electric Company, Frick Company, Endicott-Johnson Corporation, American Cast Iron Pipe Company, The American Rolling Mill Co., Wright Aeronautical Corporation, Frigidaire Corporation, Barlow Foundry, Inc., National Cash Register Company, Armour and Company, Western Electric Company, Textile Machine Company, The Firestone Tire & Rubber Company, Western Clock Works, The Roycrofters, Mesta Machine Company, Westinghouse Electric and Manufacturing Company, and Westinghouse Air Brake Company; also Wentworth Institute and Antioch College.

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INTRODUCTION

For a generation there has been developing in Europe and America a literature the main purpose of which has been to improve industry through improving the human factor. Meanwhile, improvement of industry has largely been confined to improving materials and equipment and operations and processes. Thus, the new literature has been in conflict with the old industrial methods which followed the trend of preceding generations.

Only recently have engineering schools become directly interested in what is sometimes referred to as social engineering. This changed attitude is a result of the progressive attitude of many engineers whose experience has convinced them of the need for human engineering in industry.

In the meantime, these leaders and their writings have been affecting industry through many avenues. John Dewey, who is little known by industrialists, has influenced school men everywhere and through the schools has influenced industry. Taussig has been felt in industry as truly as he has influenced economists wherever economics is considered. The same may be said of Thomas Nixon Carver, Irving Fisher, and others.

Such books as *Instincts in Industry* by Ordway Tead, *Manpower in Industry* by E. S. Cowdric, *Why We Behave Like Human Beings* by George A. Dorsey, and *The Myth of the Individual* by Charles Wesley Wood have had more influence upon industry than anyone may know. An article by William Allen White in *Harper's Magazine* may compete with an installment of Bruce Barton's *The Man Nobody Knows*, with an editorial by Glenn Frank in the local newspaper, or with *The Mighty Rourke* by Theodore Drieser in *Twelve Men*.

The social sciences have contributed much toward the improvement of industry. Economics, psychology, and medicine have made remarkable progress in this direction. Industrial psychology is making its appearance. Industrial economics has come to be recognized.

The literature of industrial medicine treats of the problems *in* industry. Thus, E. W. Hope, in *Industrial Hygiene and Medicine*, emphasizes lighting, heating, and ventilation; dust as a cause of disease, industrial infection, occupational affections of the skin, special senses, and similar details of peculiar interest to those engaged in industrial medicine and in its utilization in the service of industry.

The accomplishments in industrial medicine are noteworthy. Following the same procedure as to the selection of content, industrial economy should emphasize such economic details as may be applied directly in industry and leave to the general science of economics the responsibility for emphasizing details which affect industry indirectly. For example, economics deals with rent, interest, public ownership and control, insurance, population, property tax, urban rents, and changes in the value of money. These are of great importance to industry, but there are other subjects which are of much greater immediate interest to the rank and file of industrialists. Accident prevention, first aid, cost control in production and delivery, standards of production, coöperation in production, stabilization of employment, orderliness in industry, and similar economic questions are subjects of special interest to students of industrial economy.

The dominant note in the progressive thought and literature from all fields which during the past twenty years has been making itself heard in industry, is one of open-mindedness. Upon this one point, all of the leading sociologists, psychologists, economists, and philosophers are united. The use of the results of research in the physical sciences is dependent upon the open-mindedness of many individuals. Representatives of every industrial creed and alignment are agreed upon the economic value of the open mind. If this and future generations are to benefit appreciably from the progressive thought dealing with industrial economy, something must be done to get these ideas to function directly in industry. Since open-mindedness is fundamental to progress and an open mind is associated with a desire to understand, it follows that economy, which is to function most fully *in* industry, should

emphasize the economic significance of open-mindedness throughout the study.

Since open-mindedness, like any other term, may be variously defined according to the understanding of different individuals, it is evident that in order to help his readers form unbiased judgments, the arguments of a writer should be supported by the opinions of representative writers in the field. In view of this fact, the author has introduced into the subject matter the conclusions of representative persons in connection with the particular subjects discussed. Thus, not only is a source book provided but readers are given opportunity to become acquainted with opinions which carry the weight of leadership.

In response to numerous requests from industrialists and school officials for material to be used in vocational classes and foreman training, many detailed questions and additional references are included. These questions and references have been selected with a view to practical application of the fundamentals upon which the discussions are based.

Fundamentals are always fairly simple. It is in the superstructure that complex questions arise. Since this study concerns only the fundamentals of production and distribution, no attempt has been made to go beyond an elementary treatment of the economic questions considered. On the other hand, there has been no attempt to simplify unduly the subject matter. It is sincerely believed that this has been overdone by some authors in their effort to talk down to workers and foremen. A long industrial experience has convinced the author of this book that this is a mistake.

The difference between chief executives and many of the foremen and workers in industry is not found in their choice of reading matter or in their ability to understand what they read. Men differ with reference to the way they think and act regardless of their positions in industry. It should be understood also that some men rise in industry as a result of fortunate circumstances. Many otherwise capable men remain in the ranks because they do not like to assume responsibilities of supervision. Thus, the ability of a man

to understand cannot be judged entirely by his position in industry.

There are certain fundamental problems which make themselves felt in industry everywhere. The same underlying difficulties which compel American industrialists to become interested in accident prevention, standards of quality and quantity production, delivery, cost control, employment, and industrial coöperation are making themselves felt in Soviet Russia. Industrial economy is not primarily concerned with systems of government or of managerial control. *Governments may fall and systems of management may be changed, but production and distribution must go on forever.* The prevailing idea in this study has been to secure recognition by industrialists of whatever rank or interest of their ultimate mutual obligation to produce economically.

Friendship, faith in the fairness of those with whom we work, and willingness to approach each question with an open mind without regard to conditions of ownership have been uppermost in the mind of the author as fundamentals in the economical use of energy in production. Whether it be a corporation or a small shop, the human problems are the same. The closed mind is always accompanied by prejudice and suspicion. Where there is a general lack of faith in the fairness of associates, happiness is impossible to most persons.

This book is based upon the conclusion that a healthy, happy workman, foreman, or executive is a better workman, foreman, or executive than one who is unhealthy or unhappy. Happiness being a state of mind, it follows that mental attitudes are economically important. It is assumed that responsibility for agreeable conditions in industry is shared to some extent by all.

One of the major expense items in industry is supervision. The more supervision is required in production, the more production will cost. Doubtless, also, supervision is the point of friction and unhappiness in an industrial organization. The possession of skill and understanding of operations and processes cannot always be depended upon to reduce supervision greatly.

Beyond all skill and understanding is interest in the work to be done. It is in this field of human interest that this book is intended to function. That this interest must be mutual is evident to experienced persons. The aim of this study is to reduce expense and friction resulting from needless supervision through increased interest in production and distribution and better understanding of the various human elements in every industrial situation.

CHAPTER I

The Economic Value of the Open Mind— Reality versus Superstition in Industry

All conscious activity is preceded by an idea or a series of related ideas. First, we think about doing something and finally decide when and how to do it; or we decide not to do it, after which we proceed to avoid doing it in accordance with our decision. What we take into account before making our decision is an indication of the open or closed state of our minds.

Whether writing a word, digging a ditch, building a bridge, or getting out of bed in the morning, if we purpose to do the thing then, the activity is preceded by thought. Dr. John Dewey, in his book, *How We Think*, says:

¹ "Ideas are not then genuine ideas unless they are tools in a reflective examination which tends to solve a problem. . . . Logical ideas are like keys which are shaping with reference to opening a lock." Our ideas should unlock our minds.

Again he says: ² "There is no label on any given idea or principle which says automatically, 'Use me in this situation'—as the magic cakes of Alice in Wonderland were inscribed 'Eat me.' The thinker has to decide, to choose; and there is always a risk, so that the prudent thinker selects warily, subject, that is, to confirmation or frustration by later events."

In other words, the thinker selects his ideas, that is, mental tools or keys, according to their possible use in connection with the thing he proposes to do or assist in doing. This selection of ideas has a direct bearing upon the practice of industrial economy and deserves special consideration.

The Problem of Monotony

For example, let us assume that a young man accepts employment in a factory where he finds himself one among many

¹ *How We Think*, p. 109; ² p. 106. D. C. Heath & Co., 1910.

workmen each of whom is engaged in performing a few simple operations all day long. Here we have several problems which not only have troubled many new employes but have also caused much industrial unrest. Industrial unrest is very expensive in any form but is most expensive when in the form of an unsolved problem affecting the happiness and contentment of an otherwise capable and earnest worker. If there are tools to be found for such employes to use in such situations, it will certainly pay *industrialists to furnish them. If there are keys to be had which will unlock this problem of incipient industrial doubt we must find them. This is one of many specific situations in industry in which judgment is required.

Good Judgment Is Needed

Addressing school teachers, Dr. Dewey discussed good judgment as follows:

¹ "A man of good judgment in a given set of affairs is a man in so far educated, trained, whatever may be his literacy. And if our schools turn out their pupils in that attitude of mind which is conducive to good judgment in any department of affairs in which the pupils are placed, they have done more than if they sent out their pupils merely possessed of vast stores of information, or high degrees of skill in specialized branches."

In summing up his reasoning upon judgment, Dr. Dewey says: ² "For learning is not wisdom; information does not guarantee good judgment."

If we are to be useful to the young man in question, it is clear that we must furnish him opportunity for gaining ideas or tools for thinking, the use of which will aid him in forming sound judgment in solving his problem of adapting himself to the monotony of his daily work.

Repetitive Labor and Production

First, let us examine the problem of monotony of operation

* By Industrialists is meant all those engaged in industry.

¹ *How We Think*, p. 101; ² p. 107.

which enters so largely into production activity. What ideas will help employes to overcome the mental depression due to monotonous performance? We must understand at once that highly repetitive labor is not undesirably monotonous to many persons. Mr. Henry Ford, in his book, *My Life and Work*, says:

¹ "Repetitive labour—the doing of one thing over and over again and always in the same way—is a terrifying prospect to a certain kind of mind. It is terrifying to me. I could not possibly do the same thing day in and day out, but to other minds, perhaps I might say to the majority of minds, repetitive operations hold no terrors. In fact, to some types of mind thought is absolutely appalling. To them the ideal job is one where the creative instinct need not be expressed. The jobs where it is necessary to put in mind as well as muscle have very few takers—we always need men who like a job because it is difficult. The average worker, I am sorry to say, wants a job in which he does not have to put forth much physical exertion—above all, he wants a job in which he does not have to think. Those who have what might be called the creative type of mind and who thoroughly abhor monotony are apt to imagine that all other minds are similarly restless and therefore to extend quite unwanted sympathy to the labouring man who day in and day out performs almost exactly the same operation.

"When you come right down to it, most jobs are repetitive. A business man has a routine that he follows with great exactness; the work of a bank president is nearly all routine; the work of under officers and clerks in a bank is purely routine. Indeed, for most purposes and most people, it is necessary to establish something in the way of a routine and to make most motions purely repetitive—otherwise the individual will not get enough done to be able to live off his own exertions. There is no reason why any one with a creative mind should be at a monotonous job, for everywhere the need for creative men is pressing."

¹ *My Life and Work*, pp. 103-104. Garden City Publishing Company, 1922



The first factory of the Ford Motor Company—
Courtesy of Ford Motor Company.

Monotonous Work Sometimes Desirable

Whether or not we like to admit it, it is a fact that highly monotonous, repetitive work is in many cases desired by workers. But we should proceed with the assumption that many workers also possess what Mr. Ford terms a creative type of mind. The creative mind enjoys thinking new thoughts. A creative mind may be likened to progressive mechanics who like to use new and different kinds of tools. Creative minds like to use new mental tools—new ideas. And there is no measure of the extent of ability to do creative thinking.

This gives us a key to our problem and enables us to present a solution of the young man's problem regarding monotonous work. All he need do is to look deeper into his job. Bulwer Lytton showed appreciation of this principle when he wrote:

¹ "But in the small as in the vast, God is equally profuse of life. The traveler looks upon the tree, and fancies its boughs were formed for his shelter in the Summer sun, or his fuel in the Winter frosts. But in each leaf of these boughs the Creator has made a world—it swarms with innumerable races. Each

¹ From Elbert Hubbard's Scrap Book.

drop of water in a moat is an orb more populous than a kingdom is of men."

Creative Thinking Is Productive

Let the creative mind but seriously study to learn all about the thing he is doing and there is opened up a marvelous adventure. What a history is revealed in a grain of coffee or in a single wood screw! Whence came the ore from which this pen point is made? What were the processes through which it passed in the course of its transformation? Not only do we solve the problem of monotony through happiness in investigation by the creative mind, but we are able also to guarantee positively to such a person that, if his industry shall equal his understanding, by the time he has learned all there is to know about his present job there will be another one ready for him. There is nothing more certain in industry than advancement for the industrious, creative thinker. But he must have formed habits of using mental tools skillfully.

Habit, like any other force, can be used constructively or destructively. There are many constructive habits which are more truly assets than stocks and bonds.

The habit of research must be developed if we hope to keep going forward in industry. The first step in this direction is the gaining of that mental attitude which is absolutely essential to the possession of an open mind. We shall never be in a position to view industrial situations in an open-minded fashion until we do adopt this attitude. It is simply that we must live here and now. This does not imply that we should not plan very definitely for the future. It simply means that when once our plans are made, we should give our full attention to the job in hand.

Living Here and Now

Living here and now is the most severe test of the open mind. We should plan for the future and live and work today. Our plan like a ladder should be set squarely upon the foundation of present conditions.

The habit of basing a plan on the present is well described by Dr. William Osler in *A Way of Life*. Speaking to Yale students, he told of a period in his early life when he was much worried as to the future, both as to final examinations and as to his professional work. On picking up a volume of Carlyle, his glance fell upon the familiar sentence—"Our main business is not to see what lies dimly at a distance, but to do what lies clearly at hand." "A commonplace sentiment enough," Osler remarks, "but it hit and stuck and helped, and was the starting point of a habit that has enabled me to utilize to the full the single talent entrusted to me."

Using a Single Talent

Making full use of these single talents is the supreme achievement of human service. Dr. Slosson, writing on the subject of "The influence of coal-tar on civilization," mentions an instance of single talent usefulness which illustrates the point being discussed:

¹ "One day Dr. Koch was being shown through the Breslau laboratories, and as he passed a table where a young student was busily engaged in staining microscope slides, he was told: 'This is our little Ehrlich. He is a first-class stainer of tissues, but he will never pass his examinations.' "

It is a matter of record that Ehrlich did not pass those particular examinations, but the hard-working young man who specialized in staining tissues became one of the famous men of science. That branch of science known as chemotherapy is a direct result of Ehrlich's staining operations. Chemotherapy has yielded remedies for diseases that had previously been designated "incurable." It was Ehrlich who first stained the tubercle bacilli and paved the way for systematic treatment of the dread tuberculosis.

Ehrlich the stainer found that methylene blue would destroy the parasite that causes one type of malaria fever. Then he made molecules of methylene blue that would attach them-

¹ *Science Remaking the World* by Caldwell and Slosson, pp. 65-66. Garden City Publishing Company.

selves to the parasite. Later he learned to make molecules which would not only attach themselves to particular, harmful parasites but would also carry poison into the living cells. He discovered arsphenamine, known also as salvarsan or "606," which carries arsenic as a part of its molecule. As Dr. Slosson says:

"The number shows the difficulty of this research, for it means that 605 failures preceded this success."

Think of it, 605 failures! What an open mind had Ehrlich! Patience is another evidence of an open mind—willingness to try again and again. Industry has profited immensely from the human research of Ehrlich.

Human Research Pays Dividends

Industry is now beginning to engage in human research on a broad scale. In this field of research, medical departments were among the first endeavor. They have probably become more firmly established as a result of the enforcement of compensation laws. The strong tendency of these departments to develop preventive service is evidence of progression. This is but a step in the direction of the broader program of mental and social development which will succeed the narrower though commendable conception of human development through maintenance and improvement of physical health.

Many factories have excellent medical departments where workers receive attention the cost of which would ordinarily be prohibitive. In these industrial medical departments, treatment is considered good business. In the more advanced departments, the employe receives this service as his right and the company physician or nurse performs it in the interest of industrial economy and human service.

An example of such service is described by Mr. Harvey Firestone in the book *Men and Rubber*:

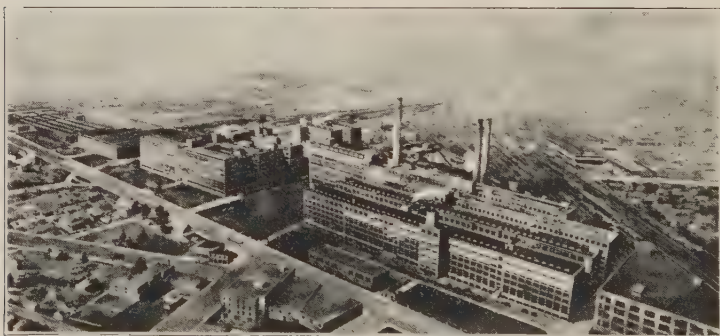
¹ "When a new employee is hired, he is turned over to the doctors and dentists for examination, the idea being to give

¹ *Men and Rubber*, p. 143, published by Doubleday, Doran and Co., 1926.

such employee advice as to the best means of preserving his health."

Medical Service as Human Research

Firestone employees are reported to be unusually well informed concerning balanced diets and methods of avoiding colds. Like the employees in many other plants, they receive assistance if they become ill or through other unusual circumstances come to need financial help. If an employee is healthy but below standard physically, he is placed where his physical handicap will not handicap production. The Firestone Company has long employed a gang of deaf mute tire builders under an instructor who is specially prepared to assist these men. This is merely an extension in industry of the type of open-minded service of which Ehrlich's contribution is an example.



Akron, Ohio, Plant of Firestone Tire and Rubber Company.
Courtesy of Firestone Tire and Rubber Company.

Present Opportunities

Not long ago a young man was heard to say: "If I had lived in the days of Columbus or James Watt, I could have done great things. But today, there are not many great things left to do." This attitude is good evidence of a narrow mind and is a source of industrial waste.

It is true that for nearly a hundred years the habitable lands of the globe have been fairly well charted. There is no

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need for another Columbus. Up to the beginning of this century, even the most advanced scientists believed that the greatest laws of science had been discovered and we had only to develop our control of such forces as steam and electricity. That is, no more Newtons were needed, it was thought. That we have gone forward is due entirely to the scientists who viewed the world with an open mind.

Within the last thirty years we have discovered that all our present knowledge is as a grain of sand on the shore of truth. Television, airplane flights across the oceans, the extraction of radium from lead and helium are indications that these limitations of knowledge are breaking down. Back of these well-known accomplishments are the Michaelsons, Einsteins, and others whose names possibly we do not recognize today. In any event, we have come to realize that we do not even glimpse what the future may hold.

Only the open-minded person can survive in the industrial system of this age. In a former generation, the progressive could become conservative and survive for several decades. Today a man of thirty may be out of step with his plant because he is merely holding on to the ideas he learned at twenty-five.

The Courtesy of Open-Mindedness

An open mind is an active mind. Such a mind is hospitable. It is unprejudiced. An evidence of a wise person is his willingness to entertain new ideas. Entertaining new ideas is like entertaining guests in our homes. Sometimes we go to the door in response to a knock or ring and find an agent who tries to interest us in something we have no desire to see or hear described. In such case, we close the door with as much courtesy as the occasion permits. Over persistent agents have sometimes compelled housewives to form the practice of opening the door very slightly.

If we made the mistake of peering out through a narrow opening in the doorway when greeting all persons regardless of the time or nature of their visit, we would soon acquire

the reputation of being queer. Such persons lead narrow lives and get out of step with the world.

A narrow-minded person is one who treats every new idea as if it were an unwelcome intruder. One is not expected to accept every idea any more than one is expected to invite every stranger into the home. But common decency demands that ideas like persons who knock at our doors be met with sufficient welcome to enable us to decide their possible value.

A wise man listens to new ideas courteously, reasons carefully, decides fairly, and acts promptly in the light of his decision. The narrow-minded man is full of prejudice and so greets suggestions with his mind almost closed. He is always ready to slam the door in the face of every new idea.

Mental Cramp

Sometimes a mind seems to be seized with a cramp. Then it gets a sort of semi-permanent set. Such a mind may behave like a balky mule, and we hear the person spoken of as having a "mulish" disposition. "Mulishness," inhospitality toward new ideas, and stubbornness are the same thing.

Dorsey in his *Why We Behave Like Human Beings* challenges the narrowness of vision which accepts the present as the best possible. He says:

¹ "Why is man not as free as he might be? Because his mind is made up; his pride of opinion outweighs his desire to know; he dismisses realities with a 'God's in His Heaven—All's right with the world,' and neglects the first lesson he ever learned—which is, that he can learn. Because he refuses the dare thrown to him by nature herself: Know thyself; and refuses to heed the warning written across every page of history and strewn across the face of the earth itself: the best defense is offense, versatility rather than walls or armor-plate, foresight rather than hindsight. Man alone can set man free.

"The human being that can learn no more has parted

¹ *Why We Behave Like Human Beings*, pp. 483-484, published by Harper and Brothers, 1925.

with the only priceless possession in human inheritance. The men, women, or nations that harden in their mould, get set in their ways, crystallize their opinions and beliefs, and swear by and live according to their routine habits—such men, women, or nations are old; senile decay is at hand. In them creative evolution has ceased to function.”

Mental ruts must be avoided if industrial relations are to be agreeable and economy is to prevail.

INTEREST QUESTIONS

1. When two people are of presumably equal intelligence but one is well informed and the other has more limited information, which is more likely to be stubborn? Why?
2. What is the relationship between narrow-mindedness and each of the following: Fear? Ambition? Curiosity? Job pride? Self-consciousness? Self-respect?
3. What is the relation between open-mindedness and physical health? Explain.
4. How may faith in others be used to overcome narrow views?
5. How does related study advance new ideas?

READING REFERENCES

1. Dorsey, George A. *Why We Behave Like Human Beings*, pages 481-484.
2. Emerson, Harrington. *Efficiency*, pages 100-101.
3. Florence, P. Sargent. *Economics and Human Behavior*, “The economists’ defense,” chapter III.
4. Lincoln, Edmond E. *Steps in Industry*, “Common sense in management,” chapter XXXIV.
5. Robinson, James Harvey. *The Humanizing of Knowledge*, revised edition, “On the scientific mood,” pages 22-25; “The scientist and his tendency to dehumanize knowledge,” pages 32-37.
6. Shearman, Henry P. *Practical Economics*, pages 10-11 in chapter I.

Human Engineering and Industrial Economy

7. Slosson, Edwin E. The Physical Sciences, particularly "Our unknown knowledge," pages 11-12, in the Reading with a Purpose Series of the American Library Association.
8. Slosson, Edwin E. Chats on Science, page 16 and chapter VI.
9. Wiggam, Albert E. The New Decalogue of Science, "The mental habits for a new approach," pages 273-288.

CHAPTER II

Five Points of Open-Mindedness

Standards of Measurement and Progress

It is generally conceded that perfection in any line is humanly impossible. Much depends upon methods of measurement and as these improve our idea of perfection advances. Before micrometer calipers were invented, our idea of mechanical accuracy was much less nearly perfect. With the invention of the vernier attachment, the original micrometer was greatly improved in accuracy. This improvement has been developed until, with the aid of detectors and the microscope, measurements are taken which make those seem very crude which depended upon the "hinged" or "spring" caliper in the hands of even the most highly skilled worker.

All progress is directly dependent upon the development and use of methods and standards of measurement. Remove from our factories all measuring devices for ascertaining length, breadth, thickness, weight, velocity, pressure, vacuum, and other properties of space or matter, and it would be impossible to continue production as it is now carried on.

In general, it may be said that every improvement in methods and standards of measurements has resulted in improved standards of production and higher standards of living. In view of these facts, less experienced persons might conclude that improvements in methods and standards of measurements are welcomed by everyone. Unfortunately, this is not the case. Every advance in methods of measurement has met some opposition. This is a natural result of habits having been formed which in the use of new methods must of necessity be changed.

Mental Adjustments Essential

"Off with the old and on with the new" is easier said than done. New connections must be made in our brains and in

other parts of the complex nervous system whenever new methods are learned. If we assume that a violinist who has spent years playing the violin should suddenly by reason of an accident be compelled to learn the fingering with the hand with which he formerly had used the bow, we have an extreme example of what takes place in industry with a greater or less degree of difficulty when new methods are introduced. Many an oldtimer who had become accustomed to using old-style calipers insisted and some are still found who insist that they can "feel" closer with the old-style tool than the expert can measure with a micrometer caliper. Naturally, the progressive mechanic knows better, but this does not prevent the oldtimer from voicing his belief, which is in reality voicing opposition to change.

An Evidence of Mental Growth

One evidence of continued ability to grow mentally is our willingness to entertain new ideas. When one begins to reject all new ideas, he has ceased to grow mentally. A person with such fixed opinions is mentally to be compared with those rare unfortunates all of whose cartilages turn to bone. Such physical change is called ossification. Thus, persons who refuse ever to consider new ideas or who reject all upon slight consideration are called "boneheaded." If one is always willing to entertain new ideas and at the same time has developed a habit of questioning their possible value as a basis for his logical decisions, he is said to be open-minded. Open-mindedness implies five things: (1) Seeking accurate information; (2) adequate reasoning upon the probable use of the information; (3) acceptance or rejection of new ideas (decision); (4) careful practice in using new ideas; and (5) continued use of the information until later information suggests disuse. If any one of these steps is neglected, there is less assurance of developing soundness of judgment.

There are certain recognized standards which do not admit of physical measurement. There is no caliper by which we may measure conduct. Yet there are rules. For example,

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the "Golden Rule" has long been accepted as a guide to good conduct. Good here signifies as before "the greatest good to the greatest number."

Profits Essential to Business

Each group finds the necessity for certain guiding principles. One general rule all industrialists must bear in mind is that the great majority of companies are in business for the purpose of making a profit. The average business will soon be bankrupt if we fail to observe this rule. This rule does not imply that making profits is the only consideration.

This leads to the conclusion that even some of the greatest rules may be applied in connection with others required by the particular situation. There is never a time, however, when we may not follow the five-step plan in meeting new situations. The more successful workmen will be those who follow this procedure with reference to every operation.

Human Interest and the Open Mind

All philosophy and all logic are associated with open-mindedness. Ethics has its foundation in interest in other human beings which is possible only where the open mind prevails.

Bulwer Lytton said: ¹ "Man is arrogant in proportion to his ignorance. Man's natural tendency is toward egotism. Man, in his infancy of knowledge, thinks that all creation was formed for him. For several ages he saw, in the countless worlds that sparkle through space like the bubbles of a shoreless ocean, only the petty candles, the household torches, that Providence had been pleased to light for no other purpose but to make the night more agreeable to man.

As a Little Child

² "Astronomy has corrected this delusion of human vanity, and man now reluctantly confesses that the stars are worlds, larger and more glorious than his own—that the earth on

¹ From Elbert Hubbard's Scrap Book. ² From Elbert Hubbard's Scrap Book.

which he crawls is a scarcely visible speck on the vast chart of creation. . . .

"Everywhere, then, in this immense design, science brings new life to light. Life is the one pervading principle, and even the thing that seems to die and putrefy but engenders new life, and changes to fresh forms of matter."

¹ "Science," said Huxley, "seems to me to teach in the highest and strongest manner the great truth which is embodied in the Christian conception of entire surrender to the will of God. Sit down before the fact as a little child, be prepared to give up every preconceived notion, follow humbly wherever and to whatever abysses Nature leads, or you shall learn nothing. I have only begun to learn content and peace of mind since I have resolved at all risks to do this."

Thus, we witness the value attached by a great scientist to the open mind.

Certainly, whether it be the development of a scientific fact, the achievement of religious appreciation, or the promotion of industrial processes, the open mind is essential to success. Without an open mind, we cannot hope for mental growth.

The Greatest Need in Industry

The open mind is the greatest need in industry. It is the greatest because all improvement depends upon open-mindedness. The narrow mind may be opened provided we are fortunate in meeting some one who will thrust a steel bar of understanding into the narrow aperture of our mind. Even in the face of our vigorous protests, a narrow mind may be made less narrow. But for the closed mind there is no hope.

Luther Burbank who had watched the flowers and plants open their buds to the sunlight had learned something of men and minds. The following comes to us laden with the fragrance of his gardens and the wisdom of his ripened years:

² "We must learn that any person who will not accept what he knows to be truth, for the very love of truth alone,

¹ From Elbert Hubbard's Scrap Book. ² From Elbert Hubbard's Scrap Book.

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is very definitely undermining his mental integrity. It will be observed that the mind of such a person gradually stops growing, for, being constantly hedged in and cropped here and there, it soon learns to respect artificial fences more than freedom for growth.

"You have not been a very close observer of such men if you have not seen them shrivel, become commonplace, mean, without influence, without friends and without the enthusiasm of youth and growth, like a tree covered with fungus, the foliage diseased, the life gone out of the heart with dry rot, and indelibly marked for destruction—dead, but not yet handed over to the undertaker."

Coöperation, an Economic Necessity

What are some of the economic details of industry toward which we should have an open mind?

Those who read this question may even now be keenly alert for the seeds of propaganda which may lurk within the conclusions to be drawn. But let us see if we can find a few economic truths which will apply as well however and wherever industry is organized. Let us state one of these truths and examine it from several angles.

Charles Steinmetz, the great electrical engineer, overcame the handicaps of physical inequality and worked his way up from the obscurity of emigrant life to leadership as the scientific genius of the General Electric Company. He announced the following economic truth: "Coöperation is not a sentiment—it is an economic necessity." Will anyone object to his observation? No. Then why do we not act upon it?

An economic necessity is something human beings must have as the basis for the existence of human welfare. Coöperation is a condition necessary to secure these necessities. It is not a mere economic good, that is, a thing capable of gratifying some human desire, but the very basis on which the whole structure of human welfare is erected. It implies

a give and take which usually involves an exchange of something of value.

Coöperation and Sentiment

Already we begin to see much more in the simple truth so convincingly announced by the great Steinmetz. How many of us have in the past really considered coöperation as a sentiment? When we desired it, were we always prepared to give something of value in exchange for it?

What about the worker? He wants coöperation from his foreman and from the owner of the factory. In the mind of the worker, this coöperation takes the form of wages, working conditions, hours of work, vacations, and many other things of interest to workers. But what does he offer in exchange? Certainly, that which he offers must have equal value, for one cannot get more out of a truly economic situation than he puts in.

And what of the employer? He wants the coöperation of workers. What about the exchange of values? Shall he expect to get when he does not give? Such a situation is not economic. "Well, well," say some workers and employers, "after all, this coöperation business may as well be slightly sentimental." Who is right about it? Steinmetz or the sentimentalist? Steinmetz has the weight of all the logic of industrial history upon his side. The difficulty is our unwillingness to open our minds to a conception of a good as economic and necessary which we have enjoyed thinking of at convenient times as a sentiment.

The Economic Value of Truth

The beautiful part of acceptance of any truth is that truth itself is economic as applied to industry. The obvious thing in the relations of worker to owner and employer to employe is that the nearer they come to believing in each other, to being real friends, the better will be the situation of each. There are two businesses in every business undertaking. One is the business of the employer, which is to produce economic

goods at a profit; the other is the business of the employe, which is to earn from the business in which he works the money with which to maintain himself and his home and family. Naturally, each has a hazy sort of notion as to his just share of the enterprise in which he is engaged. Naturally, also, each may fail to achieve the full measure of his ambition. One thing is certain, the employer cannot expect his employes to be interested in his business if he is not interested in theirs. On the other hand, the employe cannot expect the employer to be interested in his home maintenance and promotion problems unless the employe shows a genuine interest in production and delivery for profit.

Mutual Interest Is Good for All

It is difficult to estimate the waste in industry which can be traced directly to lack of mutual understanding. It is only where open-mindedness has been achieved that we are able to observe the possible economic value of understanding coöperation. One of the largest manufacturing plants of its kind in America producing a well-known article of commerce courageously announced a policy which recognized the following guiding principles:

1. Service to stockholders (owners).
2. Service to the public (consumers).
3. Service to the employes (producers).

Having announced these principles, they proceeded to "tackle" the hardest job in labor management: They announced their determination to furnish regular employment with at least a minimum living wage. Furthermore, a pension plan was arranged. The business is a highly seasonal one and presents much more than average difficulty in stabilization. While it was admitted that stabilized employment was difficult, everyone concerned announced his determination to do the best he could to furnish regular employment. The year 1921 was one of greatest depression in this business and proved a test of regular employment. The factory met the test and continued to pay all employes a living wage.



Interior view of A. C. I. P. Co. cooperative store for employees. Courtesy of American Cast Iron Pipe Company, Birmingham, Alabama.

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This company maintains one of the best medical and dental departments in industrial America. The medical staff includes the leading physicians, surgeons, and dentists in the district. All ordinary medical service is free to all employes alike. This extends to the members of families of employes. Dental service includes the making of artificial teeth and all manner of bridge work and filling. The cost of dental work is limited to the cost of materials. An infected tooth is considered a matter of economic interest. When a child is born, every care is taken to assure the comfort of the mother and child. This extends to hospital care and the services of an expert physician and nurse. These services are extended alike to superintendents and laborers.

Coöperative Enterprises Foster Good Will

The employes found that the cost of groceries and merchandise was sometimes varied as a result of inability of the corner groceryman and merchant to buy in quantity. A large coöperative store was provided. The company erected a saw-tooth steel store building and put in the original stock which included everything from groceries to automobile tires. This store has a record over a period of years of being able to sell on an average of eight per cent under the chain stores of the district.

The company makes a regular practice of keeping its employes informed of the income and expenses of the factory. Everyone who visits the plant is impressed with the interest each employe takes in production. Quality and quantity standards mean something in this plant. There is an atmosphere of contentment throughout the organization and incidentally the stock pays excellent dividends. Officials refuse to allow magazines to publish their story. They say that some might think that their effort was merely for display.

Different Methods in Different Plants

Not every plant has exactly the same problems in medical service and merchandising. Another large corporation special-

izes in home ownership, providing a fund of over a million dollars to employees to use in building homes. There are no "strings" attached to these home loans. The homes are sold at actual cost to the company and at great saving to employees.

The taking of group life insurance policies by industrial plants has grown so rapidly in recent years that a million dollar coverage is no longer a remarkable amount. One of these policies protecting many employees was considered so large that no one insurance company was ready to underwrite it, and it was divided between two of the largest insurance companies in America. This particular company also maintains excellent educational facilities where any employee who desires may study for advancement. Thousands of young men who have taken advantage of opportunities in this company's plants throughout the country have done their part to increase the value of its stock through improvement of production.

Some one will say that these methods are limited to the powerful corporations. Out in the middle West is a small factory specializing in a product which is highly competitive. The president is general manager, office manager, and general superintendent. Sometimes he takes hold on the job. He knows all those who work in the plant and is genuinely interested in their welfare. Employees have been chosen because of their ability to produce and willingness to co-operate. There are thousands of places like this from Maine to California. Some will not remain small shops. A number will grow with amazing rapidity. The presidents of a number will grow away from the job and the employees will be chosen less wisely. Most of these newly great companies may "pass out of the picture" as rapidly as they came. A few will go on growing until everyone will hear of them; and some will be wise enough to understand that there is an economic value in the open mind which means continual growth in relation to changing environment. Some historic changes deserve special attention.

INTEREST QUESTIONS

1. Why do our ideals advance with our greater appreciation of standards of measurement?
2. How do we measure human conduct?
3. Mention one standard of measurement for industrial relationships.
4. What are industrial relations?
5. Mention one standard of measurement of human conduct which may be compared with "crude" standards of mechanical measurement.
6. Why are persons who disregard personal courtesy usually referred to as "crude?"
7. Is it possible to be courteous and firm? Explain.
8. Why are some persons so opposed to change of methods and practices?
9. How does opposition to change benefit the human race?
How does it harm the race?
10. What is a conservative? a radical? a progressive?
11. Why is an extremist in any line usually considered unsafe?
12. Why is it usually considered unwise to try to "pioneer along more than one line at one time"?
13. What is pioneering?
14. Under what circumstances is one justified in practicing or advocating extreme measures?
15. How may we judge the wisdom or unwisdom of a proposed change involving human conduct?
16. How may economics assist us in deciding the justice of shop rules?
17. Why is a person arrogant in proportion to his ignorance?
18. Why is conceit an evidence of ignorance in some form?
19. Why does open-mindedness foster peace of mind?
20. Give several examples of the economic value of the open mind in industry.
21. Mention several great public questions which could be settled satisfactorily to all concerned if mutual open-mindedness prevailed.

22. Why is it harmful to industrial relations to consider coöperation sentimentally?
23. Why are industrial relations plans which do not include service to owners, consumers, and producers likely to fail?
24. Under what circumstances might it be harmful to the interest of all concerned to maintain medical departments, coöperative stores or similar services in connection with industries? Under what circumstances might these be beneficial?
25. What are some outward evidences of open-mindedness upon the part of an individual?
26. Which one of the following is more open-minded: (a) One who accepts all statements of authority without question, (b) one who rejects all statements of authority without investigation, or (c) one who questions every statement of everyone but is willing to be convinced? Why?
27. What should an employe do if he questions the wisdom of a company policy?
28. If a worker doubts the effectiveness of a method of operation which has been chosen by his company, how may he demonstrate open-mindedness concerning the question?
29. Is willingness to try a new method evidence of an open mind? Under what circumstances might this be debatable?
30. Why are prejudice and open-mindedness opposed?
31. Select a well-known industrial policy and illustrate the use of the five-step plan in demonstrating an open mind.
32. Why is full coöperation impossible without open-mindedness?

READING REFERENCES

1. American Engineering Council. Waste in Industry, "Recommendations for the elimination of waste in industry," chapter III.

Five Points of Open-Mindedness

2. Bloomfield, Daniel. Financial Incentives for Employes and Executives, "Basic principles of incentive plans," page 6.
3. Conrad, Joseph. Youth.
4. Cowdrick, E. S. Manpower in Industry, "The problem of human well-being," chapter XXVI; "Principles and theories of wages," chapter XXXIV.
5. Emerson, Harrington. Efficiency, "The Gospel of efficiency," chapter XII.
6. Emerson, R. W. Essays, "Compensation," chapter III.
7. Florence, P. Sargant. Economics and Human Behavior, "Economic orthodoxy," chapter I.
8. Ford, Henry and Crowther, Samuel. Today and Tomorrow, "What are standards?" chapter VII.
9. Hamilton, Walton and May, Stacy. The Control of Wages, "Wages and the industrial arts," chapter V.
10. Johnson, Joseph French. We and Our Work, "Golden Rule adopted in this plant," pages 285-286; "Reason in a radical industry," pages 286-287.
11. Lapp, John A. Economics and the Community, pages 118-121.
12. Lodge, Sir Oliver. Pioneers of Science, "Galileo and the invention of the telescope," lecture IV; "Galileo and the inquisition," lecture V.
13. Robinson, James Harvey. The Humanizing of Knowledge, "Necessity for re-synthesizing knowledge," pages 69-77.
14. Taylor, F. W. Shop Management, pages 67-70.

CHAPTER III

Progress, a Result of Open-Mindedness.

Specialization and Industrial Stability

Specialization, with new devices and quantity production, brought need for financial assistance and with it the rise of stock companies. Thus, the ownership of many businesses gradually came to be shared by men and women from all walks of life. Ownership came gradually to be divorced from the management of operations and processes. This still further emphasized questions of human relationship and made them more difficult of adjustment. Persons whose training had prepared them to be especially appreciative of material progress had difficulty in recognizing the new type of problems which arose from the neglect of the human factor during this period of expanding production. Yet these problems arose naturally because industrial leaders had given for years almost exclusive attention to the control of materials and equipment, and bankers to whom industrialists went for assistance in developing the industry were usually experienced only in financial transactions.

An Industrial Experience

Mr. Harvey Firestone gives several personal illustrations of what the manager of a business may encounter when seeking financial assistance from men who know banking but who have less understanding of industry. In the book, *Men and Rubber*, by Firestone and Crowther, he tells of one such instance during his early experience in organizing a tire producing company: ¹"Then I set about the organization of a tire company of my own. I had no difficulty in raising the money and the company would have gone through, but the bankers, who were helping in the promotion, had on their hands a piece of property which they were extremely anxious

¹ *Men and Rubber*, p. 51.

to get rid of. They insisted that we take it as a factory—in spite of the fact that it was in no way suited for tire making.”

Bankers had not learned the truth they know so well today—that industry cannot develop in uneconomic surroundings. Here was a group of bankers willing to invest money in an industrial enterprise but whose industrial understanding was so meager as to cause them to allow a vacant building to eclipse their view of industrial opportunities and difficulties.

Later, Mr. Firestone mentions another kind of difficulty to be encountered by the industrialist in securing financial assistance. In this case, he emphasizes his own inexperience which led to misunderstanding upon the part of a banker. He had gone to a banker with the story of his young and growing business and a simple statement of his financial needs. This time, the banker had no building to rent but he did not have sufficient vision to see beyond the financing difficulties which had been revealed by Mr. Firestone. Men without vision are difficult enough in themselves but when, as in this case, they are not frank, they are doubly disconcerting. Mr. Firestone says of this banker:

The Value of Frankness

¹ “He seemed to grow more interested as I proceeded, and I thought to myself that, when I had finished, he would recommend giving me the bank. But he was just giving me the opportunity to show how little I knew about finance. He was not frank about it—I left that bank thinking I was going to get a loan. And, while I was never refused the loan, I never got it. However, I did learn something.

“What I learned was that a bank statement ought never to be in such shape that it has to be explained. Everything ought to be on the statement, and if, for some reason, an explanation of an item is asked for, then one should be able to present facts and not prospects.”

Having learned something about banks and bankers and being of a persistent nature, Mr. Firestone is able to furnish

¹ Men and Rubber, p. 42.

a happy ending to his experiences with bankers. He adds:

¹ "Another mistake I had made was in trying to borrow money from a bank without vision instead of from a bank with vision—although I had found out in selling that it did not pay to deal with small people."

Making the Right Start

Mr. Firestone first made out a plan and went directly to one of the biggest banks. Here was a case of a young man who through strict self-denial had accumulated a sum of money, started in business and, according to his own statement, had gotten to the place where he was badly in need of help and sympathy. Not that his business was unsound economically. It simply was a case of production on bona fide orders exceeding deliveries and payments. The business had to have more capital for the same reason that a hard working motor truck must have more gas. It is interesting to note that this man who today controls millions of dollars and influences the lives of hundreds of thousands of people, goes camping with presidents, and undertakes to grow rubber for a nation, remembers when he needed help and sympathy. Who knows but that if Mr. Firestone should write another book a year from now, he might be able to tell of many other and recent instances wherein he needed help and sympathy. No one quite reaches the place in the world's affairs where he does not need help and sympathy. Mr. Firestone found a big man in the big bank. He found a man of vision. He got the loan, was given valuable suggestions regarding banking methods, and best of all realized that sympathetic understanding may be found if one is willing to do his own best and make friends.

Unfortunately for industrial progress, not all industrialists of thirty years ago were like Firestone and not all bankers were like Mr. Firestone's understanding banker. Too many were like the banker who had a building for rent. To these, industry meant just one thing—investment for profit only.

¹ Men and Rubber, p. 43.

The Terminology of the Industrial Struggle

During this period of rapid but largely unrecognized evolution of the industrial system, a terminology had been developed which for more than a generation was used when discussing industrial questions.

Thus, capital, which was originally used to designate that part of our wealth subject to investment, was given a personality and became a sort of collective noun. A capitalist was one who invested wealth for the sake of dividends only. He was pictured grotesquely and was considered as interested in profits to the exclusion of service. All questions of production were thought to be incidental to profits, and the interest of capital depended entirely upon expectations of profit. Labor, which originally was synonymous with work of all kinds, came to have a personality representative of the great group of laborers or workers who were engaged in doing the mechanical work of the new world.

Opposition to Change Is Destructive

Political campaigns were waged with appropriate slogans, and politicians conjured up issues with labor and capital as potential enemies contending for mastery of the industrial field.

The handicap of opposition to new ideas is not peculiar to industry. Most of us accept some changes of life as a matter of course. We speak of a youth growing to manhood as "coming into his own," although, as was pointed out by Woodrow Wilson, there is a vast difference between "coming into his own" and "coming to himself." True, old age and death are generally accepted, although not without considerable protest. There have been nations whose principal characteristics were dramatic gestures of protest against inevitable change. What became of them? This question is of vital interest to Americans who are being constantly urged to abandon progressive production methods and return to uneconomic practices of thirty years ago. Papini, in his remarkable *Life of Christ*, describes such a condition in ancient Egypt:

¹ "Egypt, the rich spawning-bed of all the infamies and all the magnificences of the first epoch, that African India, where the waves of history broke and died, where but a few years before, Pompey and Antony had finished the dream of Empire and of life, this prodigious country, born of water, burned by the sun, covered with the blood of many peoples, inhabited by many animal-gods, this country, paradoxical and supernatural, was by contrast the predestined asylum for the fugitive.

"The wealth of Egypt was in mud, in the rich snake-breeding mud which the Nile rolled out each year upon the desert. Death was the obsession of Egypt. The soft, prosperous people of Egypt would not accept death, denied death, thought they could conquer death with graven images, with embalmings, with sculptured representation of flesh-and-blood bodies. The rich, portly Egyptian, son of mud, adorer of the sacred bull, and the dog-headed god, could not resign himself to dying. He manufactured for his second life immense necropolises full of bandaged and perfumed mummies, of images of wood and marble, and raised up pyramids over his corpses, as if stone and mortar might save them from decay."

Neophobia in Industry

It was to be expected that a civilization which so emphasized its objection to change should disappear. An evidence of virility of mind is willingness to accept new ideas. It is by no means inevitable that a civilization should pass away. Civilizations die because progress has been discontinued—because new ideas have been rejected. Civilizations die of the disease of neophobia. Slosson describes this disease as follows in his delightfully understandable *Chats on Science*:

² "The progress of mankind has been in all ages greatly retarded and at times altogether prevented by a curious sort of disease of the mind technically known as neophobia. In

¹ *Life of Christ*, p. 31, published by Harcourt, Brace and Company, 1925.

² *Chats on Science*, pp. 44-45, by Edwin E. Slosson, published by The Century Co., 1924.

a case of hydrophobia the mere sight of water is said to arouse disgust, fear, and even furious anger. In a case of neophobia the symptoms are similar but the cause is different. The neophobic patient shows marked aversion and resentment at the sight of anything new. The disease is very prevalent, and there are no drugs known that will cure it, except poisons. We all seem to carry about the germs of it, for any of us is liable to manifest mild symptoms, and in certain countries and certain centuries it has been epidemic.

"I came across a striking case of neophobia the other day in a letter written in March, 1825, by Thomas Creevey, when a bill for the construction of the first railroad line was introduced into Parliament. This is what he felt about it:

" 'I have come to the conclusion that our Ferguson is *insane*. He quite foamed at the mouth with rage in our Railway Committee in support of this infernal nuisance—the loco-motive Monster, carrying *eighty tons* of goods, and navigated by a tail of smoke and sulphur coming thro' every man's grounds between Manchester and Liverpool . . . Well—this devil of a railway is strangled at last. Today we had a clear majority in committee in our favour and the promoters of the Bill withdrew it and took their leave of us.' "

The Soul of Our Better Civilization

If what is sometimes referred to as American civilization is to survive, it will be because the rank and file of Americans have caught the spirit of Lincoln's Gettysburg address—"It is for us, the living, rather, to be dedicated here to the unfinished work, which they who fought here, have thus far so nobly advanced. It is rather for us to be here dedicated to the great task remaining before us—that from these honored dead we take increased devotion to that cause for which they here gave the last full measure of devotion—that we here highly resolve that these dead shall not have died in vain, . . . "

That is the heart and soul of the Gettysburg address and that is the heart and soul of all progress. People afflicted

with neophobia do not possess such spirit. A neophobist may be easily recognized. To adopt a phrase current some years ago, a neophobist is one who "sits upon the tail of progress and hollers, 'whoa!' " He is found in every shop and factory. He should not be confused with well-balanced conservatives who while being willing to advance are like Mr. Firestone's banker with a vision, they want to advance in the light of full understanding.

When we realize the force of mass neophobia, with all its extravagance of misinformation, and appreciate the tremendous changes in industry, together with political confusion of issues in the minds of many citizens, it is not to be wondered at that specialization in industry should be accompanied by discontent, which when widespread has come to be known as industrial unrest. The wonder is that such a combination of peculiar conditions did not end more seriously. That American industry survived and even seemed to thrive during this period should be credited directly to the spirit exemplified in the Gettysburg address. Faith in inevitable progress is the antidote for neophobia and enough Americans possessed this faith to push ahead in spite of obstacles. And there were obstacles. Many were rased by self-centered owners and managers who grasped the opportunity to multiply production through specialization while entirely ignoring the human factor. Such men seized upon the labor-saving equipment as a means of emancipation from a labor domination which had long been endured only as a necessary evil. To such owners and managers, every labor-saving device was a declaration of independence from labor dominance.

Selfishness Breeds Selfishness

It was the age-old story of selfishness creating more selfishness—of violence creating violence. Wherever a manager had been compelled to yield to what he considered unfair demands of labor, there was a tendency to make the most of specialization without regard for labor. The emancipation proclamation of specialization was heralded throughout America. Fortu-

nately, a majority of industrial managers had risen through the ranks and cherished many happy memories and companionships. These looked upon the change in a very practical manner. These saw opportunity for both owners and workers. These saw the labor-saving device as an emancipation proclamation not only from the demands of self-centered misrepresentatives of labor but also from the back-breaking hand labor. These progressive employers, together with the great body of American labor, went quietly about the work of remaking industry. But in the meantime, the forces of reaction were at work throughout industry.

Reaction in Workers' Organizations

It was inevitable that workers' organizations which had existed in varying forms for many years should be affected by changing conditions in industry. Prior to this stage of mechanical evolution, workers' organizations had been chiefly concerned with rules for apprenticeship and development of trade information.

When labor came to be recognized as a term representing workers as distinguished from managers and owners, labor organizations assumed an antagonistic attitude toward owners and toward managers as representatives of owners. This antagonism was in reality a reflection of the prevailing idea that the two great forces of capital and labor were contending for the mastery of industry.

Since capital represented economic wealth and labor represented human energy applied to production, it was natural that capital should be thought of as material, hence without feeling; and that labor should be thought of as representing the human side of industry. The literature of the time contained frequent reference to soulless corporations and one of the leading candidates for president received the nomination largely as the result of a masterly oration in which he urged—"You (capital) shall not press down upon the brow of labor this crown of thorns, you shall not crucify mankind upon a cross of gold."

Industry and Politics

As a political issue, Capital vs. Labor proved popular. Upon the wave of this popularity, it was easy for the demagogue to ride into the favor of the ever-present malcontent. Politicians and educators have not always attempted to present industrial economy to the "masses." Such important issues as collective bargaining, shorter hours, and higher wages were intensified by the introduction of labor-saving machinery. When we reflect upon the rapid development of labor-saving equipment with consequent adjustments and uncertainty of employment, coupled with one of the worst periods of industrial depression in the history of America, we are able to appreciate the natural discontent and apprehension of workers of three decades ago. Labor unions developed rapidly in this atmosphere. They followed the example of the English laborites of one hundred years before and opposed the installation of labor-saving machinery.

Writing in 1921 in his book, *What We Want and Where We Are*, W. A. Appleton, Secretary of the General Federation of Trade Unions in Great Britain, said:

¹ "Whenever unrest is accentuated by unemployment and poverty, the baser kind of politician finds ample opportunities. Sometimes he is actuated by spleen; sometimes by ambition; and sometimes he plays upon the fears and suffering of the unfortunate for the purpose of furthering his own material fortunes. Sometimes, again, it is ignorance of causes and inevitable effects which leads these baser politicians to incite others to violence and theft. Those who lack knowledge, or are without proper feeling, or who hope to make things right by doing things wrong, are actively employed to-day. They are everywhere advising the poverty-stricken and workless to satisfy their needs and desires by violent theft."

Most evidently Mr. Appleton was at that time looking into the future and anticipating something in the nature of the disturbances incident to the great British general strike which

¹ *What We Want and Where We Are*, p. 89, published by George H. Doran Company, 1922.

took place a few years later. Mr. Appleton's statements would have applied with equal force to conditions in America thirty years ago.

Specialization Coming in Great Britain

There are many evidences that Great Britain is about to enter into the phase of industrial specialization and mass production which America has experienced. It is seldom that one finds an opportunity to quote leading employers and employes in one paragraph upon such a question; but thanks to the generous attitude of Sir Charles Macara, we are able to offer a little evidence of this tendency. In his book, *Modern Industrial Tendencies*, he comments as follows upon a statement by Mr. Philip Snowden:

¹ "One is glad to see that this idea is at last gaining ground, that employers are beginning to correct their mistakes, and that the more enlightened of the workers' leaders are beginning to throw their influence into the scale on the side of a better understanding between those who find the capital and those who find the labour. Mr. Philip Snowden, Chancellor of the Exchequer in the late British Labour Government, has had the courage to come forward and tell industrialists a few plain truths. One of these, and the fundamental one, is that 'never can more be taken out of industry than is produced by that industry,' and another that Trade Union leaders and workers will be obliged to change altogether their attitude towards industrial matters. They will, he says, have to realize that they are partners in industry, that the depression of industry hits them proportionately more hardly than it hits employers, and that any progressive expansion of industry will accrue proportionately to their benefits. Trade Unions, he contends, should not be merely concerned in getting the highest possible wages they can screw out of industry regardless of the condition of industry, but rather in helping to make industry thoroughly efficient, so that the highest possible wages can be paid."

¹ *Modern Industrial Tendencies*, p. 20, published by Sherratt & Hughes, Manchester, 1926.

If these statements may be accepted as representative of the leadership in the ranks of employers and employes of Great Britain, British industry will pass through the disturbing period of adjustment to specialization and mass production much more quickly than was the case in America. American industry was the scene of a struggle which cannot be lightly dismissed even today because it left in its wake a trail of prejudices to which both sides to the controversy are heir. This shadow is fast fading away as do all shadows as the light of truth expands.

Industry Needs Light

There yet may be found, however, certain corners of industry where the light has not penetrated. Here truth must be introduced through coöperation between employers and employes. We must pause a moment and peer once more into these dark corners of industry while our eyes become accustomed to the shadows. We may learn more of the prejudices which lie as stumbling blocks in the path of those who are sincerely interested in industrial progress.

The History of Industrial Misunderstanding

In industries where labor-saving machinery seemed to threaten employment, workers and owners naturally viewed further development of labor-saving devices quite differently. At first, in these industries, representatives of owners and representatives of labor organizations endeavored to settle their difficulties by means of conferences. It was not long, however, until this effort was abandoned and all pretense of coöperation was discontinued.

Industrial evolution had led to industrial warfare with a large group of owners and managers on one hand fighting to maintain economic control of their businesses, thus protecting their own investments and those of their stockholders; and on the other hand, the labor unions fighting for a share of control of business policy in order to protect their security as workers.

The Luxury of Today, the Necessity of Tomorrow

The rise of the corporations with their greatly extended operations leading to national and international competition was accompanied by intensive advertising and sales programs. These, together with the rapid development of railroads following the Civil War, created markets which had heretofore been unknown or non-existent. Men and women were no longer content to live as their parents lived. People began to feel a need for things that their parents had considered as luxuries. Indeed, the American public was demonstrating the truth that "The luxury of today may become the necessity of tomorrow." This progression from luxury to necessity is continuous as long as standards of living are being raised. Its continuity, however, can be assured only as human energy and natural forces can be used more economically in the satisfaction of human wants.



View of International Harvester Company's Advertising Department.
Courtesy of International Harvester Company, Chicago, Illinois.

INTEREST QUESTIONS

1. Why may specialization by one competitor cause other competitors to specialize?

2. Why should specialization bring need for financial assistance in industry?
3. What is the difference between a stock company and a partnership? a corporation? (See reference No. 5).
4. What is meant by dividends?
5. Name some American capitalists who, in your opinion, are sincerely interested in human development in industry.
6. Why is it better for owners and workers to receive consideration as individuals rather than to be considered as merely capitalists and time clock numbers?
7. If owners, managers, and workers were mutually interested in each other's welfare, would there be any need for industrial organizations to assure industrial rights? Explain.
8. Is it logical to consider a corporation any more soulless than a partnership or individual ownership? Explain.
9. What is meant by "The luxury of today may become the necessity of tomorrow?"
10. How do habits interfere with progress? How may habits promote progress? What is the relation between habit fixation and open-mindedness?

READING REFERENCES

1. Brookings, Robert S. Industrial Ownership, "The separation of ownership from management," chapter I.
2. Chapman, J. Crosby and Counts, George S. Principles of Education, "How have the problems of social life been complicated?" pages 270-271.
3. Cowdrick, E. S. Manpower in Industry, "Significance of changing labor conditions," pages 59-60.
4. Dorsey, George A. Why We Behave Like Human Beings, "Acquiring human behavior," sections 12-16, pages 381-396.
5. Johnson, Joseph French. We and Our Work, "On harnessing capital," chapter X.

6. Lapp, John A. Economics and the Community, "Employees and employers," chapter XIV.
7. Robinson, James Harvey. The Humanizing of Knowledge, "Ancient barriers of knowledge," pages 62-68.
8. Shearman, Henry P. Practical Economics, "The two important functions performed by capital in modern production," chapter VII.
9. Watson, John B. Psychology from the Standpoint of a Behaviorist, "Personality and its disturbance," chapter XI, particularly "Habit disturbance and its effect upon personality," pages 412-420.

CHAPTER IV

The Relation of Human Adaptability to Industrial Efficiency

Three periods of progress are mentioned by Edwin E. Slosson in the beginning of his remarkable book, *Creative Chemistry*. In his charming manner, he uses one of our familiar childhood stories to illustrate his conclusions.

Robinson Crusoe upon his lonely island is likened to mankind. Like Crusoe, man is dependent upon his own ability and willingness to shift for himself. Man has had only what he found on the earth. There has been no way by which our ancestors might borrow from the inhabitants of neighboring planets. The first men found no traces of early civilizations from which to learn or borrow, for there were no former civilizations. This was the beginning of the settlement of the earth. These were earth's pioneers. Dr. Slosson mentions three distinct periods of progress which mark the struggle of mankind in its contest with nature. These he gives as follows:

- ¹ "1. The Appropriative Period
2. The Adaptive Period
3. The Creative Period"

Periods of Time and Periods of Progress

Quite naturally, as Dr. Slosson points out, these periods are not periods of time. Rather, they are periods of relative progress, for men and peoples progress at different rates of speed. Indeed, the number of thefts reported each day should convince anyone that many yet live in the Appropriative Period. At least, there are men and women who try to live by appropriation. This, says Dr. Slosson, was a characteristic of the primitive man. Since this is the case, we may assume that those who try to live by appropriation are

¹ *Creative Chemistry*, p. 3, published by The Century Co., 1919.

The Relation of Human Adaptability

primitive, not even "cave men," for cave men were of the Adaptive Period. The cave man was a decided improvement over the appropriator; that is, provided he did not merely hunt out some one who possessed a cave and take forcible possession.

Waste of Time Hinders Progress

Whether it be a cave in the side of some prehistoric hill or a brownstone cave on Fifth Avenue, appropriation is appropriation and is the mark of a primitive human being. Some men take money; others take time. The more primitive one is, the less he cares whose money or time he takes. When a number of men each take a little time here and there in industry, it becomes a very serious matter. When, instead of taking time, a number of industrialists use a part of the time supposed to be devoted to the production of economic goods to producing goods which cannot be disposed of, they not only appropriate time which rightfully belongs to society, but they waste materials and energy which should have been used economically. It makes no difference whether waste of any kind is deliberate or a result of ignorance, it proves that the wasters are at least temporarily out of step with industrial practices so far as planning or interests are concerned.

Industrialists Must Adapt Themselves

The big job of the present-day industrialist is to become adaptive; that is, to learn how to adapt himself to changing conditions. Beyond this lies the field of creative effort. This is the field of research. This is the field of science. It is not far from the Adaptive Period in the life of an individual to the Creative Period. It is a long and painful way from the Primitive to the Adaptive Period. It is the adaptive mental attitude that prepares one for creative thinking. As Huxley said, "All babies are born uncivilized." Every human being must learn to adapt himself even as the savage learned to build a wigwam and shape a log canoe. Instead of poles and a log and the bark of trees, modern industrialists have all manner of machinery and tools and materials. Instead of the tribe,

we have our complex governments. Instead of the family, we have thousands of fellow workers and millions of customers. Our science has accumulated until its intelligent use complicates every operation even as it blesses every enterprise in which it is used.

Living, a Creative Process

With all the complications of modern life, there can be no question but that living is easier and better than at any stage of man's progress. It would not matter if we thought this to be the most unhappy period of human development. We could no more reverse the process of civilization than we could reverse the process of physical growth. To be sure, we may bind our feet and they will not grow normally and we can bind ourselves economically and spiritually by putting on the wasteful trappings of war which have their civil counterparts in many industrial disturbances; but as long as there are a few people in an industry or a nation who are adaptable and think creatively, progress is assured. In the words of C. Judson Herrick: ¹ "Thus we see that all living is a creative process. And its value to the organism and to the community in which one lives is measured by the efficiency of the internal controls."

Creative Thinkers Live More Fully

We have heard the testimony of the chemist, E. E. Slosson. He has informed us that progress is always manifested finally through creative achievement; that is, man does something new and different. The biologist, C. Judson Herrick, reminds us that our value to ourselves and to others is in direct proportion to our personal efficiency and that those of us who live better and do a little better each day actually live more than those who do things each day as they did them yesterday.

The fact that men live more fully when they are progressing should be sufficient argument for continually improving standards of workmanship and industrial management, but there is one other argument which is especially significant in

¹ Fatalism or Freedom, p. 25, published by W. W. Norton & Co., 1926.

these days of difficult industrial adjustments. We shall be interested to hear from an industrial executive who has come to be recognized as an authority on industrial relations. Mr. Sam A. Lewisohn, writing on the subject of "General efficiency and industrial peace" in the book, *The New Leadership in Industry*, says:

¹ "Experience in industrial relations has made apparent something which was not appreciated by those who had seen the problem solely from a sentimental viewpoint. This is the close relation between industrial peace and managerial efficiency."

Efficiency Promotes Industrial Peace

This will probably be a strange thought to many who have looked upon the very word efficiency as a "red flag" in industry. Yet this is not at all inconsistent. It is the "word" efficiency that arouses hostility. Efficiency is, as Mr. Lewisohn has implied, an agency of industrial peace. The testimony of every scientist is evidence that there is an undeniable urge in normal human beings to improve and to create. In other words, normal human beings instinctively want to be more and more efficient. This urge is in the same class with the urge to eat and the urge to move. Imagine men who are hungry being entertained by some one who talks about food and we have a parallel to match the continual harping on efficiency without visible results. This vain use of the word efficiency is all the more significant in view of the fact that in most cases where there is much talk about it, there is most need for it. In such places, the natural urge of the normal individuals is strongly in favor of greater efficiency, and in place of achievement they hear words.

Slovenly Management Causes Industrial Unrest

All this has a very definite relationship to the improvement of standards of workmanship. We observe that not only is this improvement in the direction of economic and social

¹ *The New Leadership in Industry*, p. 223, published by E. P. Dutton & Co., 1926.

progress but it also has a notable moral and spiritual value in that it has a tendency to increase contentment and improve our living in the truest sense in which anyone may be said to live.

Mr. Lewisohn adds:

¹ "Indeed, we little know how much social unhappiness and industrial unrest are due just to ordinary slovenly management. To a large extent such conditions are the accumulations of the trivial things. I have seen so many instances where striking improvements in industrial relations have been brought about solely by a more scientific management, that I have become convinced of its overwhelming importance."

INTEREST QUESTIONS

1. What period of progress is illustrated by the use of water for transportation?
2. What period of progress is illustrated by the changing of the current of a stream in order to use it as power?
3. What periods of progress are represented by the Panama Canal? Explain.
4. What period of progress is illustrated when a laborer improves upon the method of loading a wheelbarrow? Explain.
5. Why is each period of progress equally valuable to industry?
6. In the light of the fact implied in the above question, why is it said that "the big job of the present-day industrialist is to become adaptive?"
7. Why is industrial peace partly a result of industrial efficiency?
8. Who sets the standards of workmanship for the average factory?
9. Give an example of the making of progress in a plant which involves all three factors mentioned in this chapter.

¹ The New Leadership in Industry, p. 224.

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10. Why do improved standards of workmanship lead to improved industrial relations?
11. Why is continued improvement of methods of manufacture an evidence of progressive civilization?
12. Why does continued interest in improved standards of workmanship lead toward industrial advancement?

READING REFERENCES

1. American Engineering Council. Waste in Industry, "Internal relations," page 216.
2. Dewey, John. Human Nature and Conduct, "Present and future," part three, section IX.
3. Dreiser, Theodore. Free and Other Stories, "McEwen of the shining slave makers," pages 54-75.
4. Hughes, R. O. Economic Civics, "Different features of industrial life," pages 101-104.
5. Hurley, Edward N. Awakening of Business, "Commercial education and the new era of business," chapter VIII.
6. James, William. Talks to Teachers, beginning with the last paragraph page 218 including the second paragraph page 222.
7. Johnson, Joseph French. We and Our Work, "Achievements of thinkers," pages 96-97.
8. Lincoln, Edmond E. Steps in Industry, "Reducing costs and raising wages through the elimination of waste," chapter XXXI.
9. Shearman, Henry P. Practical Economics, "The driving force of the mind," pages 44-45; "Cost of production," pages 173-174.
10. Taussig, F. W. Principles of Economics, vol. I, revised edition, "The division of labor and the development of modern industry," chapter 3.

CHAPTER V

Making Men While Making Money

Making men while making money should not be confused with making money while making men. While the aim of every well-ordered unit of society is unquestionably the development of human beings, this cannot be said to be the primary object of either business or industry. Industrialists as business men must realize that it is good business to develop the human factor in industry if this aim is to be achieved. An automobile manufacturer as an industrialist is concerned with the operations and processes whereby automobiles are produced; as a business man, throughout the manufacture or delivery of machines, he takes part in exchanges of money for labor, materials, parts, and finished articles. As an industrialist, the object of the automobile manufacturer is to produce automobiles. As a business man, his primary object is to make exchanges advantageously.

The automobile manufacturer is not only an industrialist and a business man, he is also a human being and is subject to all the emotional and sentimental reactions to which human beings are heir as members of the race. Furthermore, other human beings are employed by him to assist in producing and exchanging automobiles. To these he pays wages and salaries; hence industry, business and human beings can no more be considered separately than can a train load of freight be considered apart from the locomotive which is to pull it across the country to its destination.

The Dead Line of Human Service

On the other hand, we cannot maintain an economic equilibrium and abandon fundamental business principles in the average business transaction. The industrialist may be swayed just so far by sentiment in matters of wages, prices, hours of labor, rates of production, pensions, welfare activities, and

similar details, but there is always a dead line of profit and loss beyond which he may not go and remain in business.

Every industrialist who deserves also to be called a business man knows about this dead line and has his eye fixed upon it much of the time. Cost and rate departments are visible evidences of his watchfulness. For this reason, the owner of a factory cannot go into the enterprise of man making. Man making has not yet established itself as an activity which may be deemed economic within the definition accepted by economists—that an economic good is something which has an exchange value.

While man building or human development cannot become the primary object of industry, it is possible to have it become a very important by-product of industrial operation. This is what is meant by the expression “making men while making money.” It is the reverse of the expression heard frequently a few generations ago—“Breaking men while making money.” Regardless as to whether or not this savage custom ever existed, the human race has certainly reached the place and industrial leadership has demonstrated the opportunity for a new slogan in industry. Making men while making money should be the accepted secondary goal of everyone who shares in any way a part of the responsibility for coördination of human energy in production and distribution.

Industrial Realities

Some one will say: “All this is a very fine expression of sentiment but just wait until such a humanitarian employer encounters one of the many realities of industrial relationships and see what happens.” What are these realities? One of the worst certainly is unstabilized employment. What shall the humanitarian employer do when orders fall off and workmen must be released from employment? Or what shall he do when this or that employe must be discharged in order to maintain economic production? Since this is about as difficult a question as any to answer, let us go into it quite fully.

Human Engineering and Industrial Economy

Everyone who is experienced in industry knows that it is occasionally necessary to discharge an employe. The better the method of selection and training, the less necessary it is. It may even be possible that unusually well-managed factories do not experience such enforced separations. Certainly, they are to be regretted. Certainly, also, there are few executives who do not regret exceedingly the occasional necessity for discharging employes. There is nothing foolishly sentimental about this feeling; it is merely a reflection of business judgment.

Discharging the Employe

All this has a direct bearing on the difficult question we have undertaken to answer. How shall we demonstrate human interest in this most difficult detail of industrial relations? How may we show human interest even in the discharge of employes? This interest is often confused with sentiment.

Let us make no mistake about the place of sentiment in industry and in business. There are many sincere business men and industrialists who will reject sentiment in business and production. These for the most part are men who have become utterly disgusted with maudlin sentimentalism. When these men reflect upon the meaning of sentiment, there is no one but will admit to himself that sentiment has not only a place in industry and business but also that it has a tremendous influence upon every operation in industry and every transaction in business.

Sentiment in Business

Sentiment is simply a mental attitude prompted by emotion. Feeling enters very largely into the mental attitudes of most persons and each of us is prompted by feeling to some extent. If it were possible to eliminate all emotion from thought and be a thinking machine, such a person would be quite incapable of understanding normal human beings. We must see the thing as the other fellow sees it if we are his friend. We must feel as he feels about business situations

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and industrial questions if we are to put ourselves in his place.

This does not mean that we are to do as our friend does. What we do should be a result of conclusions reached after calm judgment has been brought to bear upon the situation. Sentiment is all right. Business is intolerable only when sentiment is entirely absent and is unsafe when emotion controls the situation.

Reason and Emotion

The only difficulty we have from sentiment in business or industry comes from the fact that some persons have not developed their reasoning powers as much as their emotions. Such persons are extremely dangerous in business or industry. On the other hand, the type of person who has neglected cultivating sympathetic understanding and tries to depend solely upon his reason is also a menace in every human relationship.

Appearance vs. Reality

When the disagreeable task of discharging an employe must be performed, the executive upon whom the responsibility falls usually proceeds as would a surgeon in amputating a limb infected with gangrene. The executive simply takes out his discharge slip in lieu of the surgeon's instruments and performs the separation. This is usually all the observers, including the separated one, see.

Just a little slip of paper which when presented to the clerk in the office will call for a closing up of the account of the employe. It looks so easy, the impression prevails with less informed persons that the discharge is resorted to lightly. This may be true in isolated and badly managed businesses, but we are not discussing such businesses primarily. Indirectly, we must be concerned with any agency of industrial waste. Such business policies represent "muck" in its most definite industrial sense. Well-managed businesses discharge employes only after careful investigation and when all other measures have failed.

Intelligent Separations in Industry

Any intelligent method of discharging employes, like skillfully performed surgical amputations, takes account of the general health of the body and the plan for recuperation. In industry, this requires consideration of the entire personnel in relation to production. The methods followed in one factory illustrate the intimate connection of discharges with other problems of plant economy.

Six Rules of Good Work

This large concern has established six definite rules of conduct for all employes regardless of the nature of their duties. The organization consists of two large plants employing several thousand men and women and manufacturing different products of highly competitive nature. These rules of conduct apply equally to the general manager and the most ordinary laborer. Furthermore, they have been selected because their observance assures personal success in all phases of individual life as well as assuring success on the job and in the business.

These rules have been tested for a considerable period of time and a careful check has been made of the effect of their observance on the job and in outside relationships; and there is reason to believe that the aims of this management are being achieved. Men who observe these directions do become better on their jobs regardless of the job. They also succeed better in their personal affairs, and consequently their home life is happier.

The six rules are as follows:

- ¹"1. Follow instructions willingly.
2. Be clean and orderly.
3. Take good care of property and materials.
4. Work well from whistle to whistle.
5. Work every day you can and tell your foreman when you cannot.
6. Work well with others."

¹ You and Your Work, p. 3, Frigidaire Corporation.

These are called "The six laws of good work." In this big organization, every employe is expected to know them and continually to study their application. Group and individual instruction is organized with this definite objective. An illustrated booklet with full explanations of the Why's as well as the How's of these requirements is given to every employe.

A Two-Sided Program

The two-sidedness of the program is emphasized. The legends under two appropriate cuts in this booklet are "Notify your foreman if you can't come to work" and—"and your foreman will hold your job for you until you are able to work." The common objective of all is stressed. The legend under another picture reads, "We are all working for the same boss, and that boss is the customer."

Soon after this "six law" program was inaugurated, it became necessary to "lay off" some of the employes in each department. The "lay off" was partly due to a great flood which had interfered with sales. While the number laid off was not more than is often released in many seasonal businesses this company made use of this lay off as a means for strengthening the organization.

It is not always the man who knows best how to use the best materials who is most desired on the job. The good carpenter is one who not only knows how to make the best use of good materials, but who also knows where to make use of the less finished lumber which will serve equally well in places not requiring the better finish.

A printed form was prepared which was in reality a form for recording the observance of the six laws by each individual. At the top of the card was a place for the date and the name, department, and job of an employe. Then followed the laws, and opposite each were two squares in which the employe's foreman was to place yes or no, according to whether the employe did or did not observe the particular law. At the bottom was a place for the signature.

If for any reason you should leave the employ of Frigidaire Corporation, or if you are transferred to another department, your foreman will make out a Clearance Record to show how well you have followed the six laws of good work, and file it in the Employment Department. What that record will be depends upon you. Start now to make it a good record.

CLEARANCE RECORD

Name.....	Department. No.....	Clock No.....
Address.....	City.....	State.....
Street.....	Is Laid Off.....	Is Discharged.....
Is Transferred.....	Is Quitting.....	With Without
Reason.....		Notice.....

1 Does he follow instructions willingly?.....	Yes.....	No.....	1 What work has he been doing?.....	Yes.....	No.....
2 Is he clean and orderly?.....	Yes.....	No.....	2 Does he do good work?.....	Yes.....	No.....
3 Does he take good care of property and materials?.....	Yes.....	No.....	3 Does he do his share?.....	Yes.....	No.....
4 Does he work well from whistle to whistle?.....	Yes.....	No.....	4 Do you want to re-employ?.....	Yes.....	No.....
5 Does he work every day and when absent tell you?.....	Yes.....	No.....	5 If not, do you recommend transfer?.....	Yes.....	No.....
6 Does he work well with others?.....	Yes.....	No.....	6 Has he made any suggestions for improvements?.....	Yes.....	No.....

Is he single?.....	or married?.....	How many dependents?.....	Is he buying a home?.....
Is he a member of Savings and Investment?.....	Group Insurance?.....	Relief Association?.....	
Date Employed.....	Last day worked.....		
Supervisor.....	Foreman.....		

Courtesy of Frigidaire Corporation, Dayton, Ohio.

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The day the lay off was made the foremen were called into the office in groups of from fifteen to twenty and the purpose of the form was carefully explained. Then each member of each group was encouraged to ask any questions he desired. Each foreman was given to understand that men would be retained in accordance with the foreman's report of the men's observance of these laws, and that it was the purpose of the company to avoid if possible laying off any man who was reported as having an excellent record on this basis.

Playing Favorites Made Difficult

Then came the interesting part of the program. When the records began coming in, foremen were called in to discuss very intimate details of their conclusions. Why was John Smith considered as not "following instructions willingly?" The foreman was asked to cite examples of John Smith's having violated the "first law of good work." What were the circumstances of James Brown's violating the second law? And so on throughout all of the report. Very early in this experience, some foremen asked that they be given an opportunity to revise their records. Playing favorites was soon eliminated by all in an honest endeavor to check up on the application in industrial economy of these principles. The effect of all this upon production is obvious.

Then came the real test of this program, for some men had to be laid off whose records were good. The management stated that this was the hardest thing they ever had to do in connection with managing a plant. But the case was settled under the sixth law which refers to coöperation. It will be remembered that the definition of the standard of good work applied to manager and foreman as well as laborer.

A Double Action Employment Department

If working well with others meant anything, it meant being as helpful as possible to the other fellow at times when he needed help. The company could not economically use these good men just then, but they could put their employment

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department to work to get them jobs elsewhere, and this they did.

An employment department was actually made to work both ways. Every man who had observed all six laws reasonably well was either kept on the job or a job was found for him with some other company, and when men were taken on again employes who had been laid off were re-employed in accordance with their record.

SERVICE RECORD CARD

NAME _____			CLOCK NO. _____		
DATE STARTED _____			KIND OF WORK _____		
PREVIOUSLY EMPLOYED	HOW MANY TIMES		TOTAL TIME HERE		
DOES HE DO GOOD WORK?	YES ...	NO ...	IS HE SINGLE? OR MARRIED?..		
IS HE DEPENDABLE?	YES ...	NO ...	HOW MANY DEPENDENTS?		
IS HE CAREFUL?	YES ...	NO ...	DOES HE OWN HIS HOME?		
IS HE CLEAN AND ORDERLY?	YES ...	NO ...	IS HE BUYING A HOME?		
IS HE PUNCTUAL AND INDUSTRIOUS?	YES ...	NO ...	HAS HE—GROUP INS.?..... M. B. A.		
DOES HE FOLLOW INSTRUCTIONS WILLINGLY?	YES ...	NO ...	IS HE IN SAVING PLAN?		
IS HE AGREEABLE?	YES	NO	HAS HE EVER MADE ANY SUGGESTIONS FOR IMPROVEMENTS?		

SIGNED _____

FOREMAN _____

The same type of card as used in the plant of
The Ohio Brass Company, Mansfield, Ohio.

Fundamentals of Industrial Economy

These plants have achieved remarkable savings in production. They have noteworthy records in maintenance of equipment; their conservation of materials is unusual; their "scrap" or unusable product is exceedingly low; the plants are kept clean at little extra expenditure; orderliness is apparent; and accident records are extremely low. In addition to all this, there is an unmistakable atmosphere of happiness prevailing throughout the organization. These rules are the fundamental principles of industrial economy in these nationally known manufacturing institutions. Their intelligent application by and to all employes carries the interest in each

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other's affairs beyond the plant and does it without paternalism.

Paternalism vs. Mutual Interest

The line between paternalism and mutual economic interest is the exact point where the interest shared by employes and managers is actuated by industrial economy. Paternalism is growing in disfavor and is also becoming more difficult to disguise under various names. It is well to watch the development of programs, such as the one just described, which are aimed to replace paternalism by a sharing of economic interest. If these programs are to succeed and be imitated in other plants, workers, foremen, managers, and employers must contribute their fair share of faith. This calls for mutual understanding and all-round square dealing.

INTEREST QUESTIONS

1. What is the difference between programs of "Making men while making money" and of "Making money while making men?"
2. What words are sometimes used to indicate an "enforced separation" from employment as for example the word "discharge?" What expression do you consider best?
3. Do some words sound more violent than others? What is the effect of violent words upon the encouragement of violence? Explain.
4. Is it possible to speak with finality and yet without violence? If so, describe an example. If not, why?
5. What do you consider to be ordinarily good reasons for enforced separation?
6. What is the difference between following instructions willingly and following instructions?
7. What are "instructions" as the term is applied in industry?
8. Which is the greater personal risk in the performance of industrial operations: (a) To follow instructions or (b) to follow personal inclinations? Why?
9. Could one "work well with others" and follow willingly

- instructions which he believed to be wrong? Why? What should be done in such case?
10. If 200 men whose wages average \$1000 for an eight-hour day waste ten minutes each day getting ready to begin and quit work, how much would they lose in a year if they were not paid for this waste? (Note: Consider a six-day week with no allowance for absences). If this loss were considered as an earning on an investment at 6%, what would be the principal?
 11. Which kind of company would you prefer to invest your savings in: (a) One where all workers observed the "six laws of good work" or (b) one where workers disregard them? Explain.
 12. What financial losses may be traced to failure of workers to notify company officials of inability to report to work for the day?
 13. Why does failure to care for property and materials lead to extravagant personal habits?
 14. What is your opinion of the effectiveness or ineffectiveness of the use of the "six law form" in a lay off? Would this method of laying off workers benefit good workers? Explain.
 15. How may a company benefit from a "two-way" employment department? In what ways might this two-way idea be overdone?
 16. Should we endeavor to stabilize employment for all men and women or for certain kinds of men and women? Explain.

READING REFERENCES

1. American Engineering Council. Waste in Industry, "Unemployment," chapter XI; page 392.
2. Burnham, Wm. H. The Normal Mind, "Unhygienic efficiency," "Lack of perspective," "Interference in the untrained," pages 504-507.
3. Carver, Thomas Nixon. The Present Economic Revolu-

tion in the United States, part II, chapter 3, pages 71-82.

4. Emerson, Harrington. Efficiency, "Men," pages 74-78.
5. Frankel, Lee K. Health of the Worker, pages 17-18.
6. Frigidaire Corporation and Delco-Light Company. You and Your Work.
7. Lewisohn, Sam A. The New Leadership in Industry, "Creation of a new fashion in leadership," pages 77-83.
8. Russell, Bertrand. Selected Papers, "Moral standards and social well-being," pages 263-294.
9. Shearman, Henry P. Practical Economics, "The influence of efficiency on wages," pages 329-330.



Plant No. 2 — Frigidaire Corporation, Dayton, Ohio. Courtesy of Frigidaire Corporation.

CHAPTER VI

A Fundamental of Industrial Economics— Human Engineering

Oliver Wendell Holmes once said, "Some of the sharpest men in argument are notoriously unsound in judgment." William Penn said, "Knowledge is the treasure, but judgment is the treasurer of a wise man. He that has more knowledge than judgment is made for another man's use more than his own." If we accept these great truths, we must grant the human factor its proper place as the main factor in industry. Scientific research, money, and all other material factors or industrial methods depend upon human development for success. Let us understand also that it is judgment rather than information which is most needed in industry. Unquestionably there is available today much more information than is applied. What we need is men who can or will apply it.

Thought Functions through Work

Thought must be translated through work in production. Straight thinking naturally assumes a place of economic importance. Thomas Carlyle, speaking in London, said:

"This London City, with all its houses, palaces, steam-engines, cathedrals, and huge immeasurable traffic and tumult, what is it but a Thought, but millions of Thoughts made into one—a huge immeasurable Spirit of a Thought, embodied in brick, in iron, smoke, dust, Palaces, Parliaments, hackney coaches, Katherine Docks, and the rest of it! Not a brick was made but some man had to think of the making of that brick."

Thoughts are as complicated or as simple as an automobile or a house of Carlyle's time. The human factor in industry must be developed through improved thinking and the best place to do this is on the job. For this reason, work upon a useful and productive basis should motivate all education.

Industrial Economy, a Civic Duty

Industry should be the great training ground for citizenship. Every industry is confronted with all the problems that confront the average community government. The greatest problem of all is how to reduce waste. As citizens, we must be concerned with industrial economy because our attitudes toward waste in industry will certainly be reflected in civil government.

Power, whether it is human, electrical, steam, or of other kind, costs money. Human engineering aims at increased production with decreased expenditure of energy and other resources through development of the human factor. What are some known sources of industrial waste toward the elimination of which human engineering may be applied?

According to a report¹ compiled by the American Engineering Council in 1921, the estimated waste in fifteen representative metal working plants averaged 28% for them all, ranging from 6% for the best plant to 56% for the worst.

We must not assume that decreasing waste of materials and money is the only means of reducing waste in industry. "Energy and other resources" previously mentioned mean much more than energy developed in a power plant and resources of materials, equipment, and money. One of the greatest wastes in industry as elsewhere is the waste of human opportunity and service. This waste will never be checked until there is developed a feeling of responsibility upon the part of citizens for making use of industry for human development.

Economics and Human Engineering

No intelligent person would start to drive a great distance through the country without learning certain things about the road he expects to travel. Not only would he want to know how to operate the automobile and what to do to keep it in good running order, but he would desire information concerning the condition of roads and necessary detours; above

¹ Waste in Industry, published by McGraw-Hill Book Company.

all, he would be interested in learning about short cuts and points of particular interest.

The study of industrial economics helps in the preparation for a life journey in the industrial field. These life journeys can be considered successful only when they are profitable and agreeable to individuals while being productive industrially. Industrial economics should furnish a road map and description of the industrial highway of business procedure. But this information itself will be wasted unless one has the will to work. This is the first essential. Education without the will to work is intellectual mockery. But what is will? This question leads us further into the field of human engineering, for "will" is a favorite subject for discussion by psychologists.

Psychology and Human Development

Psychology may at first sight seem not to have a place in a study of economics, but it has proved to be of peculiar interest to the rank and file of human beings. In every city and in many of the larger towns one will observe window cards and newspaper announcements of so-called popular lectures on psychology. If one sees a turbaned Hindu in the lobby of the small town American hotel, the chances are that one is gazing upon one of the army of lecturers on psychology. From the turbaned Hindu, the cult of psychology ranges upward to include a few well-informed persons who combine certain scientific information with ability to talk interestingly about human instincts and behavior. Beyond these pseudo psychologists, is the reputable scientist whose years of research recommend his conclusions to our better judgment.

No other scientific study has received such popular consideration. The reason for this popular interest is found in the fact that there is an overwhelming conviction in the mind of the average individual that psychology (mind study) somehow will explain many of the problems of everyday life. To make use of two expressions of the psychologists of all rank, people are beginning to appreciate "subconsciously" that

most of our material problems may be solved through "mental adjustments."

The Will to Do in Industry

In view of this popular conviction, students of industrial economy will be interested to learn how a well-known authority in the field of psychology views the necessity for our having definite goals in every undertaking. Robert S. Woodworth in discussing ¹ "Will" says that if we are to liberate our latent energies and be capable of doing our best, we must first have a "definite purpose." Furthermore, he says that if the goal is some distance away, we must be careful to set up secondary goals or "mileposts." Right here is where many otherwise capable persons fail. They set up a goal which they hope to achieve in a certain number of years. In the cases of students in schools, they think in a hazy sort of way of what they are to be and do when they leave school. As they are about to leave school, they realize that they are not quite able to reach the goal they had set, so they set another.

Human Incentives in Production

This thing of forever changing the goals of life is no more practicable than would be the continual changing of the goal posts during a football game. The yard lines are the secondary goals. They are the "milestones" of the football field. We must have fixed goals and we must have yard lines in our field of activity. Dr. Woodworth adds this timely advice: "Do not say 'I will try.' Say 'I will do it.' " No one ever got very far merely trying. Certainly, we should be modest in our statements to others concerning our opinions of ourselves, but in our own minds we should never entertain an idea of failure.

Another good piece of advice is given by Dr. Woodworth. He warns us against simply striving to do one's best. One's best is never really what it ought to be. There is a vast difference between one's best and our best. Our best implies

¹ Psychology: A Study of Mental Life, pp. 542-543, published by Henry Holt & Co., 1923.

competitive coöperation. This writer continues: "The runner cannot make as good speed when running 'against time' as when competing directly, neck to neck, with other runners."

First, have a good opinion of yourself; second, select a goal that you believe you have a reasonable chance of achieving; third, set up some yard lines; fourth, take careful account of what you need to help you reach each yard line and the goal; fifth, get ready for the first yard line; sixth, tell yourself, "I'll do it." Then keep on keeping on. This is not only good psychology; it is also good industrial economics.

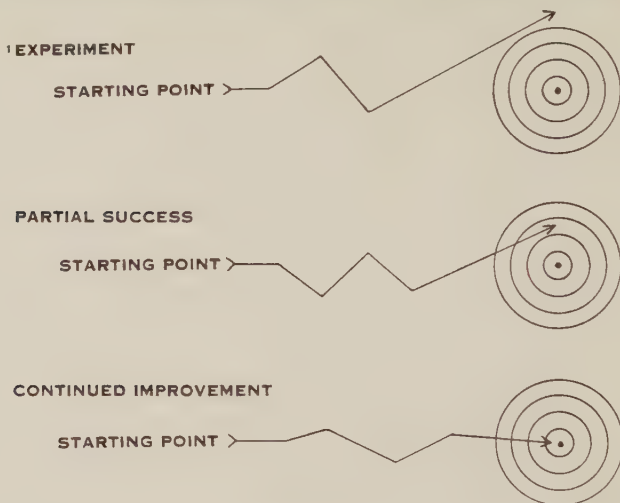
Advancement Depends on Judgment

The industrial life journey of each individual has for its objective the highest possible function in industry. Students of industrial economy have a right to expect their opportunities to increase with the increase of their knowledge and judgment. Advancement is dependent not only upon information and skill but is dependent also upon the exercise of judgment on every job and in every situation. Industrial economy, which should include understanding of human beings as well as of materials and other resources, is a study which should develop judgment in industrial relations.

It is not enough to know facts. We must know them in relationship to the jobs we are doing or may encounter. The history of all achievement is a record of three stages: First, careful experiment; then partial success; and finally, continual effort to improve operations. The diagrams on page 64 show this line of industrial progress.

Judgment Shown Through Work

The problem of all students of economics is how to straighten the line from the starting point to the goal. The starting point is the job as we find it. The goal is the highest possible production at lowest expenditure of energy and other resources. Attention is called to the fact that even in experiment the line should always be advancing. Experiments which lead backward or which neglect available information are never justified.



This is the important reason why inexperienced persons should always request the judgment of more experienced ones who are in a position to offer authoritative advice upon experiments. Failure to do this has caused much misery and hardship in the history of the world. Of one thing each student of industrial economy may be assured—the reward is certain for those who succeed in shortening even slightly the distance between the starting point and the goal. The reader should remember the words quoted in the beginning of this chapter. There will be those who appear sharp who will scoff at efforts to achieve success through earnest study of the job, but we may know that these are likely to be “notoriously unsound in judgment.”

INTEREST QUESTIONS

1. Is waste ever justified? Explain.
2. What is waste?
3. List five ways by which time may be wasted.
4. Suggest methods of preventing waste of time mentioned under 3 above.

¹ The Mother as a Teacher by Alice M. Loomis. Woodruff Publishing Co.

5. How may opportunities be wasted?
6. How may waste of one person's opportunities cause waste of the opportunities of others? of materials? of money?
7. To what extent does money represent time and material?
8. Give an example of the shortening of the line of progress for an individual which also represents industrial improvement.

READING REFERENCES

1. American Engineering Council. Waste in Industry, "The metal trades industry," chapter IX.
2. Cowdrick, E. S. Manpower in Industry, "The desire for promotion" and "Craftsmanship and the problem of monotony," pages 45-47.
3. Florence, P. Sargent. Economics and Human Behavior, "Re-organization and reform," chapter V, with special reference to pages 73-79.
4. Hughes, R. O. Economic Civics, "Making living conditions better," chapter XII.
5. Litchfield, Paul W. The Industrial Republic, "Industrial citizenship," chapter VII.
6. Smith, J. Russell. Commerce and Industry, "The fundamentals of manufacture," chapter VII.
7. Taussig, F. W. Principles of Economics, vol. I, revised edition, "Of wealth and labor," chapter I.

CHAPTER VII

The Will to Work as an Economic Asset

Many years ago all work was roughly divided into two parts: Headwork and handwork. The man who was supposed to do only headwork was called a boss. The name was given him because he was like the boss in the center of a wheel around which the spokes revolve.

When more complicated machinery came into use and larger plants were built, it was seen that in place of one wheel in the industrial organization with one set of spokes revolving around one shaft, there were a great many wheels, all of which must work together like a train of gears run by power from one source.

A large factory today has many departments which must fit together like the many parts of a complicated machine. Modern equipment has so multiplied production that each one who works has more or less responsibility for seeing that each thing he does fits in with all other things he does and with the work of others. In other words, every job in modern industry, however humble, may be likened to a train of gears which must track with other trains of gears, and which all together make up a great, powerful machine. The aim of this machine is to produce food, clothing and shelter, and also add to the comfort and happiness of all.

All of us know what happens when gears do not fit as they should. Usually there is a great deal of noise and more or less friction. When this friction is lessened, the machine runs better and is more powerful.

Management and Work

Power, which all men want for one reason or another, is not to be had without work. No one ever became powerful by shirking his duties. Neither is it work that destroys men. True, there are limits to human endurance, and fatigue is a

factor in economics; but work as it is ordinarily known is an inseparable part of successful management of individual affairs or a business. Robert Burdette who was once famous as a humorist, entered the ministry and was equally successful. The following from the pen of "Bob" Burdette sums up the convictions of experienced persons upon the subject of work.

¹ "My son, remember you have to work. Whether you handle pick or wheelbarrow or a set of books, digging ditches or editing a newspaper, ringing an auction bell or writing funny things, you must work. Don't be afraid of killing yourself by overworking on the sunny side of thirty. Men die sometimes, but it is because they quit at nine p. m. and don't go home until two a. m. It's the intervals that kill, my son. The work gives you appetite for your meals; it lends solidity to your slumber; it gives you a perfect appreciation of a holiday. There are young men who do not work, but the country is not proud of them. It does not even know their names; it only speaks of them as old So-and-So's boys. Nobody likes them; the great, busy world doesn't know they are here. So find out what you want to be and do. Take off your coat and make dust in the world. The busier you are, the less harm you are apt to get into, the sweeter will be your sleep, the brighter your holidays, and the better satisfied the whole world will be with you."

Too many people think of management as telling others how to work. It is true, a manager would do this, but management should not be disassociated from work. All management requires work and all work requires some management.

Fixing Responsibilities Avoids Confusion

Frequently we are surprised when first we learn that in a technical sense, power is the rate of doing work. Confusion results in many cases from failure to agree upon definitions. Confusion of understanding is one of the most harmful influences in industry, and definition will lessen confusion by fixing responsibility and clarifying situations. Furthermore, if

¹ From Elbert Hubbard's Scrap Book.

responsibilities are fixed, it will be found that essentials have been defined.

When confusion exists among a group of industrialists regarding division of responsibilities, misunderstandings are multiplied. Every misunderstanding is certain to result in friction. Since friction in industrial organizations results from misunderstandings and misunderstandings are multiplied by failure to place responsibility, it follows that one way to reduce friction is to fix responsibility.

The first step in learning how to do a certain job is to learn exactly what is to be done. Likewise, the first step in learning to manage even a small job is learning exactly what the job includes. To go beyond the job is wasteful and to leave it nearly finished is even more so.

Knowing "where we get on" and "where we get off" is a part of the duty of every industrialist and contributes to successful operation. If a tooth is broken off in a gear and a substitute is welded in its place, the mechanic must take care that the substitute is finished to the same size as its fellows. If the new tooth is left too large, there will be a decided bumping sound when the gear revolves in its place. This illustrates what happens in an industrial organization when one tries to cover more territory than that for which he is responsible. On the other hand, if a tooth is too small, the gear will rattle at this point. There will be also a slight loss of power as the machine will hesitate for an instant unless other teeth assume the work which the undersized tooth fails to perform.

Management in Work

Management may be defined as the art of getting jobs to work together smoothly. A manager is one who does things to cause jobs to work together effectively. The more jobs one has to keep going smoothly, the more management he has to do. That is why we speak of the man who indirectly looks after all the details of a large factory as the manager.

We should not lose sight of the fact, however, that every

one who does anything to make things go smoothly between his job and other jobs, manages. He also manages who coordinates the operation of what are too often wrongly termed "less important jobs." In this sense, all good workers manage.

Two great mistakes commonly made are: (1) Thinking that all the management is done in the front office by a few men; (2) thinking that all the work is done by men in overalls. The truth, as we have seen, is that all men, including the ones who bear the title of manager, work; and all, including the most unskilled worker, may manage in connection with their daily work.

INTEREST QUESTIONS

1. Give an illustration of how a laborer might manage while employed as a laborer.
2. Give some examples of headwork in connection with a job; of handwork.
3. Give an example of how friction might be developed between jobs. How would you go about it to avoid this condition?
4. What are some of the duties of a man who bears the title of manager?
5. What is the first essential of management?
6. Are there different kinds of management? Explain.
7. How does management differ?
8. Give an illustration of how a workman might effect a saving through the exercise of management on some job.
9. How may the will to work be developed?

READING REFERENCES

1. American Engineering Council. Waste in Industry, "Major causes of waste in normal times," page 214.
2. Dewey, John. Democracy and Education, "Labor and leisure," chapter XIX.
3. Firestone, Harvey S. and Crowther, Samuel. Men and Rubber, "The first profits," pages 61-66.

4. Hadley, Arthur Tanning. *Economic Problems of Democracy*, "Democracies old and new," pages 1-18.
5. Hughes, R. O. *Economic Civics*, "Producing things," chapter VII, "Making industry better," chapter XIII.
6. Kilpatrick, W. H. *Source Book in Philosophy of Education*, "Progress not inevitable," from *Theories of Social Progress* by Todd, quotation 380.
7. Sheldon, E. E. "The elements of economics: Why, when, where and how to teach," in *American Management Review*, May, 1925, volume XIV, pages 148-153.
8. Snow, A. J. *Psychology in Business Relations*, "What type of fact is most easily remembered?" page 310.
9. Tead, Ordway. *Instincts in Industry*, "The instinct of self-assertion," chapter VI.

CHAPTER VIII

Human Beings and Jobs as Units in the Industrial Organization

Man is the most wonderful organization. The brain, heart, lungs, stomach, kidneys, skin, eyes, hands, feet, and other parts of a healthy body coöperate more or less perfectly in order that man may think, breathe, digest his food, eliminate waste matter, see, feel, manipulate, walk, and otherwise go about the activities of living. An organ is a part of the body that does a special work. Every part of the body which has a special job to do is an organ. An organization is, therefore, a group of coöperating organs.

In this sense, a machine is an organization. Locomotives are organizations; automobiles are organizations. Cylinders, valves, pumps, batteries, and similar parts are organs having special jobs to do, each of which is necessary to the functioning of the machine of which it is a part.

A family is an organization of human beings—the father, mother, and children each having certain things to do. If any member of the family ceases to do his part, the family is weakened to this extent exactly as a man is handicapped through becoming paralyzed in an arm or leg.

There are organizations, such as the human body, the primitive family, and certain elementary forms of government, whose primary functions appear to proceed somewhat automatically. In contrast to these are organizations such as modern governments and industrial and business institutions.

Inspiration Through Coöperation

There is something about working with others in a great organization that is inspiring. Thomas Nelson Page expressed this feeling as follows:

¹ "A great factory with the machinery all working and

¹ From Elbert Hubbard's *Scrap Book*.

revolving with absolute and rhythmic regularity and with the men all driven by one impulse and moving in unison as though a constituent part of the mighty machine, is one of the most inspiring examples of directed force that the world shows. I have rarely seen the face of a mechanic in the act of creation which was not fine, never one which was not earnest and impressive."

Any organization of human beings is interesting because of its social significance.

All governments are social organizations organized by men to make it easier for men to live together. Industry and business enterprises of all kinds are social organizations since the different parts necessary to the successful operation of the industry or business must be brought together and kept working through the efforts of persons.

Every Job Important

Thus, it is seen that every person who has a job, the performance of which must be considered by the manager, is a part of the organization. It is as unnecessary to debate the relative importance of essential positions in an industry as it is to debate the relative importance of the various organs of the body.

For example, some one may suggest that the heart is a more important organ than the skin and at first thought it might appear to be true. If, however, certain perspiration areas of skin were sealed, as with varnish, the kidneys would be required to carry off the waste matter which normally is continually discharged by the skin. The effect of the extra load being assumed by the kidneys might finally endanger the condition of the heart itself; hence the skin, which sometimes receives slight attention, has power to influence the heart to the extent of endangering our lives. On the other hand, if the kidneys fail to perform their function, the skin must work overtime to do a part of the work of the kidneys. In this case also the heart may become involved. Eye strain has been known to cause serious nervous disorders; ulcerated

teeth may cause heart disease; and indigestion is a frequent cause of illness, one evidence of which is headache.

The bodily ills which result from failure of units in the body are typical of industrial ills which result from failure of individuals or departments to perform their respective duties. It is apparent that the bodily organization parallels the industrial organization in many ways.

General Understanding Needed

One way in which the industrial organization resembles the bodily organization is with reference to our general knowledge of its functions. It is a curious fact that many men are much better informed about the functions of different parts of an automobile or other equipment than they are in regard to the functions of the various organs of the body. This also is frequently true of our understanding of industrial organizations.

The average worker has very little notion of what is meant by overhead. He knows that the company maintains an accounting department, but he has only a hazy idea of how it operates. The production department may sometimes view the planning department as an evil to be tolerated. Foremen are sometimes found who seriously question the value of personnel and employment departments.



Employment Office—Gary Tin Mill.
Courtesy of American Sheet and Tin Plate Company.

Like the teeth in the gear which itself is only a small but

necessary part in a train of gears, each job however unimportant it may appear to the inexperienced observer, is in reality a vital unit in an industrial organization. If this job is neglected, the health of the whole industrial organization will certainly be affected.

Industrial Waste Injures Everyone

Edwin Markham once told a story of a wealthy man's interest in the family of a hard working carpenter who seemed never to be able to accumulate enough money to buy a home. The wealthy friend employed the carpenter to build a house for him for a certain sum of money. The carpenter, seeing that his employer was apparently too busy to watch details, decided to use inferior materials and give only such attention to workmanship as would be necessary to "get by." When the house was completed, it had the appearance of a good job; but in reality it was quite poorly constructed. The carpenter eased his conscience with the thought that his employer was "able to stand the loss" and would not live in the house; hence would probably never learn of the deceit. Imagine his disappointment when the man whom he had cheated made known to him that he had intended all along to make him a present of the house when finished. "Here is the deed," said he. "Take it and move your family into the house and enjoy the fruits of your own hard labor."

There are many persons employed in industry who, like the carpenter, are working each day on jobs in which they wrongly think they have little direct interest. Like the carpenter, they injure themselves most of all. Every job is an important part of the industrial organization in which it functions, and the one who does the work is building his own future as surely as he devotes his own precious time to the enterprise. If the job is poorly done, his own time and opportunity are to this extent wasted. The only opportunity in industry must come through the improvement of individual jobs, themselves units in the industrial organization. The industrial organization is composed of a closely welded chain of jobs each link of which

Human Beings and Jobs

must hold firmly in its place and carry its full share of responsibility. An industrial organization is not as strong as its executive. It is as strong as the weakest link in its endless chain of jobs.

INTEREST QUESTIONS

1. What is a unit in an industrial organization? Why?
2. Why is it possible for both employee and his job to be units in an industrial organization?
3. What effect would slighting one job have upon another job to which it is closely related?
4. What methods would you suggest as a means of strengthening an industrial organization?
5. Is it possible for a job to be overdeveloped? Explain.
6. Does a job have an organization? If so, indicate what you believe to be its units.

READING REFERENCES

1. Caldwell, Otis W. (Caldwell and Slosson) *Science Remaking the World*, "Louis Pasteur," pages 133-149.
2. Cowdrick, E. S. *Manpower in Industry*, "The foreman as a factor in labor management," chapter XIX.
3. Ford, Henry and Crowther, Samuel. *Today and Tomorrow*, "Educating for life," chapter XV.
4. Franklin, Benjamin. *Franklin's Autobiography*, "Beginning life as a printer," chapter II.
5. Jewett, Frances Gulick. *The Body at Work*, especially "Discoveries by a Grecian and an Englishman," chapter X.
6. Johnson, Joseph French. *We and Our Work*, "The story of industry," chapter II.

CHAPTER IX

The Value of Standards of Workmanship

Work Defined

All of our great industries began in a small way. The first railroad was only a few miles long. The first telephone service was furnished to a very few persons by extremely simple equipment. The great corporations which supply the world with farm machinery had their beginnings in small shops in which a few men did all of the work. Our remarkable automotive industry was started in one-room shops where, in most instances, one or two men did all of the work of production and management. It will be noted in the preceding sentence that reference was made to the "work of production and management." This is done to emphasize the technical definition of work, which is "Force acting through distance constitutes work."

The extent of the distance through which force acts in producing work may be small or great. It may be inches or miles; it may extend through a small or a gigantic industry. Work is done by the stroke of the piston of an air hammer used in chipping castings, and also in the continuous operation of a giant locomotive drawing thousands of tons of freight from one part of the country to another. Work is done by persons who contribute in any way to the application of force.

Distance implies direction; directed force results in work. Industrial work may lead in the direction of the goal of production, or it may lead away from it. It follows then that one of two kinds of workmanship may be found according to the productive or unproductive results of applying force. From an economical point of view, it is not enough to work; we must be constructive in our work. Industrially speaking, to be constructive is to be productive.

The Value of Standards of Workmanship

Power Is the Rate of Doing Work

Power, we have learned, is the rate of doing work. To the extent one works he is powerful. This is the fundamental reason why the loafer always will be held in contempt by normal human beings. It is impossible for a person to loaf continually, but if such a person could exist he would be entirely without power. Although power is the rate of doing work, it is the rate of doing poor work as well as that of productive activity.

Since work may vary greatly with reference to quality of workmanship, some work being poor while other work may be fair, good, or excellent, it is impossible to measure the productiveness of a plant by merely determining the power of an industrial unit. Individuals who make up an organization and the industry itself are judged according to their productiveness.

Standards of Work Necessary

In the interest, therefore, of individual opportunity as well as of industrial economy, we must have standards of measurement whereby we may determine the relative value of our work. As our great industries have developed, there have been developed at the same time certain standards of measurement by which the work of every person who is employed may be judged more or less accurately.

The stage of advancement reached by this "scientific age" is said to be dependent upon the refinement and standardization of measurements. Before the time of King John of England, a yard meant the distance from the middle of a man's chest to the tip of his outstretched hand; and the possible variations in this standard are obvious. When King John's "reach" was officially accepted as the standard yard throughout Great Britain and later when other countries adopted the same unit, much confusion was prevented. Just as the accurate standardization of the English yard was useful in the primitive industries of 700 years ago, so modern industry has need of generally recognized standards of workmanship.

Standards of physical measurement, however, differ in one vital point from standards of production. The primary physical measurements are definitely fixed or standardized. While much remains to be done in the standardization of commercial physical measurements, such as sizes of containers and parts, there is an active movement in this direction. The situation is quite different in the case of standards of quality and quantity production; instead of being fixed permanently, they must be constantly improved if industry is to advance.

The persons who set up standards of workmanship are busy every day and their identity is of interest to everyone engaged in production or distribution. Who is it that establishes and revises the standards of workmanship which are applied to industry? There is no certain individual who does this. Standards are always a result of progressive development.

Who Sets Up Industrial Standards?

When a new employe takes his place in a factory or workshop, he receives a number of impressions regarding methods of management and operation. Whether he is employed in a large factory or in a small shop, he gradually learns that comparatively few standards of quality and quantity originate in the factory. The exceptions to this rule have to do with products or new models of manufacture. Even in these cases, the new products or models will not be in great demand unless their standards have been fixed in accordance with certain requirements.

The gauge of railroads illustrates the change of one standard and its effect upon others. Years ago, all of the railroads of the country placed the rails much closer together than they now are generally laid. With the increase of size of locomotives, a wider track became necessary. As roads adopted this practice, they were known as broad-gauge railroads and the other style was called narrow-gauge. This change in gauge naturally required many changes in the standard measurements of locomotives. Imagine a locomotive factory using narrow-gauge track standards for driving wheels in the orders



Introducing the new man to the foreman.
Courtesy of The American Rolling Mill Company, Middletown, Ohio.

for locomotives for broad-gauge roads! Its business prospects would be about as hopeful as would be those of a merchant who habitually attempts to sell customers articles of really high grade but which the customer cannot use.

Standards Must Be Understood

Satisfaction of producer and consumer depends upon a common understanding of that which is to be transferred from one to the other. With the rise of industry and improvement of standards of measurement, we have come to depend more and more upon drawings and specifications in production. Sometimes these specifications are written in great detail, the accompanying blue prints being also in great detail. At other times, orders are received in which specifications are much less detailed. It does not follow that less detailed specifications permit greater variation. Sometimes variation is possible within certain limits, but in many other cases very definite

requirements are set up by mere reference to generally accepted standards. For example, if a foundryman desires to order pig iron, he may do so by number, the number representing certain generally accepted specifications. On the other hand, if he should receive an order from a hardware firm for window weights, no mention of the exact grade of iron might be made. He would not be expected to use exclusively high grade pig iron in the manufacture of window weights, as they are usually cast from less expensive metal. Who was it decided the grade of iron from which the average window weight is made? Nobody knows.

Markets Influence Standards of Work

Market prices have been established upon bases of generally accepted standards, and these govern very largely the manufacture of articles. The buyers of products have come to expect certain quality and quantity production and turn naturally to producers who are in positions to meet their specifications.

This is one of numerous illustrations of the operation of a law in economics known as the law of supply and demand. Certain articles are demanded by customers. Industry is organized to meet these varying demands and may not wander far beyond the limits of these requirements.

The various industries, such as the foundry, automobile, and building industries, are organized for the purpose of supplying demands for specific products. Just as these industries are limited, so are factories more limited in specifications. Each factory or business soon establishes its standards of quality and quantity deliveries; and when these are once established, it becomes somewhat difficult to depart from them. If a factory has built up its business by its ability to supply specific articles of recognized minimum quality in certain quantities within understood limitations of time, its very existence depends to some extent upon continuing production along these lines.

Thus, it is seen that the operation of certain natural laws

which govern the transaction of all business determines very largely the quality of workmanship and the rate at which the work is accomplished in any successful organization. Continued failure to observe these laws of business procedure is certain to be followed by failure in business. The law of supply and demand operates in modern industry to fix the quality and quantity of production. Quality and quantity production may be safely changed in only one direction—that is, in the direction of improvement. Neither the management nor workers have power to reverse this process in a successful business.

INTEREST QUESTIONS

1. What is meant by a standard as the term is used in this chapter?
2. If a man spoiled every job he attempted to complete during an entire working day, would he have done any work?
3. The amount of energy required being equal, does a man do any more work in doing a good job than in doing a bad job? Explain.
4. Two men work on similar jobs. A is an unusually strong man; B is an ordinarily strong man. Each expends the same amount of energy on these particular jobs. Which of the two is the more powerful in this connection? Why?
5. Is loafing ever justified? Explain.
6. What is loafing?
7. Is it possible to loaf and work at the same time? Explain.
8. Prepare written specifications for a simple job.
9. If the market price of an article falls below the cost of production, what, in your opinion, should be done by those responsible for production?
10. Is it possible for the market price of an article to continue long at a figure less than the cost of production in an economically managed plant? Explain.
11. What is the connection between costs of production and standards of workmanship?

READING REFERENCES

1. American Engineering Council. Waste in Industry, "Standardization," pages 26; 190-194.
2. Chapman, J. Crosby and Counts, George S. Principles of Education, "Problem 22. What is the responsibility of the school for vocational education?" pages 508-539.
3. Hughes, R. O. Economic Civics, "The things we want," chapter II.
4. Johnson, Joseph French. We and Our Work, "Marketing our products," chapter XI.
5. Snow, A. J. Psychology in Business, "Merchandising," chapter X.
6. Spring, LaVerne W. Non-Technical Chats on Iron and Steel, second edition, "The early history of iron," chapter I.
7. Taussig, F. W. Principles of Economics, vol. II, revised edition, "The equilibrium of demand and supply," chapter 39.

CHAPTER X

Improved Standards of Living through Quantity Production of Goods of Market Quality

Quantity production results largely from inventions and discoveries which give man greater control of his surroundings or give him control of a larger environment. Labor-saving machinery is, therefore, intimately associated with man's ability to increase his production and his opportunity both as an individual and as a member of the race.

Until Gutenberg invented the art of printing, all books were printed or written by hand. They were decorated in the same manner. Some of the world's greatest artists began their careers by decorating the margins of books.

In 1765, Hargreaves of Blackburn, England, brought about the most important improvement in the method of spinning that had been made in five thousand years. His invention, the spinning jenny, spun many threads at a time. This was followed in 1769 by Richard Arkwright's invention of a machine which performed all of the operations of carding, roving, and spinning at the same time. The year that Arkwright invented his first machine, James Watt invented the steam engine, which brought another force under the control of man. It has been said that "If the whole population of the world in the time of Jesus could have been brought together, their united efforts could not have applied enough energy to propel one of our largest ships across the ocean at the speed of twenty-five knots, because the people would have been unable to concentrate their energy on a small spot."

Production Standards and Standards of Living

The history of the development of quantity production is a succession of accomplishments which previously had seemed impossible. The daily lives of people have been affected by this development in many ways only four of which are noted

here—the increase of the product per person, the decreasing of the hours and physical labor of workers, the increase of the comforts available for many people, and the greater number of people employed in industrial plants. These and other changes are inseparably connected as results of quantity production.

The steam shovel and the magnetic crane have been introduced into many industries, one machine doing the work formerly done by hundreds of men. The foundry industry is a notable example of increased production resulting from mechanical improvement paralleled by increased numbers of persons employed in foundry work.

The decrease in the hours of labor and the decrease of physical labor during the last century are too well known to require discussion.

¹ Through mechanical and other improvements, the production of pig iron in America alone has risen from 53,908 long tons in 1800 to 39,372,729 tons in 1926. Production of steel has risen from 68,750 tons in 1870, at which time it was first considered of sufficient importance to be reported in the Federal Census, to 48,294,000 tons in 1926. Although the product of one person's effort is much greater today than a century ago, this increase in tonnage indicates also a very great extension of the people employed in these industries.

Quantity Production Increases Employment

More persons are employed today in any one of a number of our large metal working plants than were employed in all the metal working plants in America in 1800. Paul Revere was a worker in copper, brass, and bronze. If all of the men who were employed in working non-ferrous metals at the time of the patriot's famous ride could be assembled today, their number would probably be insufficient to operate one of our large brass working factories.

There are more people employed in the textile industries of America today than lived in New England at the time

¹ Data from *The Iron Age*, January 5, 1928.

machinery was being introduced in textile work. A far greater number of persons are employed in any one of many large printing establishments today than were employed in hand lettering all of the books produced in England before the invention of the art of printing.

Quantity Production and Human Happiness

In those days, books were so expensive that only the very wealthy could afford them. Modern public libraries would have been impossible. Public education aided by text books in the hands of students would have been impractical. It is difficult for us living in the twentieth century to imagine what changes would result if we should suddenly be compelled to depend entirely upon handwritten books, magazines, and newspapers.



Roycroft Print Shop where artistic handwork is featured.
Courtesy of The Roycrofters, East Aurora, New York.

The weaving of cloth has added immensely to the comfort of the human race. It is interesting to speculate upon the changes which would result if it were possible by waving a wand to sweep us backward into the times prior to the mechanical development of the textile industries. Only the wealthy could afford garments of fine texture. Today, it is

possible to purchase cheaply cloth which in the days of Queen Elizabeth could have been worn only by a very few well-to-do persons.



View of the Textile Machine Works. Machine production in pleasant surroundings. Courtesy of Textile Machine Works, Reading, Pennsylvania.

The tremendous impetus given to civilization and the immeasurable benefits derived by humanity from the development of machinery and production in larger amounts would seem to have been welcomed by the men and women of every generation. It is hard, therefore, for us to understand the opposition which at times has been shown by people to the introduction of machinery and the use of its products.

Objections to Mass Production

Two of these objections only are noted here—the objection to the so-called quality of the machine-made product and the possible effect upon the workers previously employed in production by the slower methods.

It is astonishing to think that when printing was first coming into use, printed books were considered vulgar by some people. A number of wealthy persons continued to have their books printed and decorated by hand. Even after printing became more common, it was still the custom of a few men with abundant resources to have artists make hand-

written copies of the printed books. While textile machinery was being introduced into English mills, many continued to purchase the handmade articles as being more exclusive; and the handworkers, fearing the loss of their livelihood, mobbed those who endeavored to use the new made machinery, smashed the machines, and demolished the buildings that housed them. As in every other industry, the rapid growth of the metal working industry has paralleled the development of machinery. As in every other, the introduction of machinery has been opposed by less thoughtful persons.

No greater mistake can be made than to suppose that increased employment at increased pay will result from curtailing production. All one needs do to explode this theory is to apply it to one individual. If a person produces less, he will certainly have less. Wages are based upon production. Standards of living increase with production. Money is useful only as an aid in performing commercial transactions. The individual of today has a standard of living which requires more than ever before of the products of the textile factories, print shops, steel mills, machine shops, foundries, and other industries. Every improvement in operation means a higher standard of living for this and future generations and also consequent increased opportunity for employment at a remuneration which will enable producers to enjoy the benefits of improved living standards.

Human Service in Production

Every engine flywheel has a counterbalance without which the machine of which it is a part would eventually be shaken to pieces. This counterbalance is designed to be of a weight equal to that of the driving rod and crank pin. The driving force of civilization is the desire of normal human beings for progress, for more abundant and better living; the driving rod and crank pin transmitting this force are the inventors and discoverers of new and better methods of doing things—and this includes labor-saving machines. Without these, progress would cease. Competition, which is the peculiar

inheritance of an emancipated people, would disappear. Coöperation would lose its interest for want of stimulation. Human development depends upon industrial advancement.



Main Research Laboratory of the Westinghouse Electric and Mfg. Company, East Pittsburgh, Pennsylvania.
Courtesy of the Westinghouse Electric and Mfg. Company.

The counterbalance of daily production and consumption naturally prevents civilization from going to smash through failure to maintain human service because of devoting too much attention to inventing and discovering. If all those who are engaged in the production and development of iron and steel should suddenly cease these activities while endeavoring to find uses for metals known but slightly used at present, human needs would be neglected and all progress finally halted.

Unbalanced Idealism—Dangerous

There is nothing so unsafe in industry as an unbalanced idealist when he has power. We need to have a far-reaching vision; but if we keep our eyes always inclined upward, we may expect to stumble. The most difficult thing for some persons to do is to realize that they live here and now. This does not mean that we should abandon research and progress. Living here and now will help us to appreciate possible opportunities for improvement. Planning and living are two very different things though one improves the other.

Improved Standards of Living

This brings us again to the question of production for markets. The market is a reality which cannot be ignored. Markets mean specifications either implied or written. These become the guide to our understanding of quality and quantity production. Their observance by producers is evidence of producers being realists. Some one has said, "Go to the bottom of your business, if you would climb to the top." Cervantes said, "By the street of by and by, one arrives at the house of never." The producer who understands that productive power is the rate of doing constructive work is on the road to success. The next step is through improved quality and quantity production.

INTEREST QUESTIONS

1. In your opinion, what industry has advanced most rapidly through mechanical development?
2. In your opinion, what industry has made the greatest advance through mechanical development?
3. Name ten outstanding developments which resulted from introduction of special machinery.
4. What is a machine?
5. What have been some of the difficulties met in introducing machines into industry?
6. Select any job ordinarily done by hand and suggest a specific method for effecting a saving in doing the job.
7. Mention one unsolved problem encountered in industry.
8. What studies would aid in solving this problem?
9. What is meant by production? Who is a producer?
10. What is market quality?
11. Which of the four ways mentioned in this chapter by which the daily lives of people have been affected by machine production do you consider most important?
12. Why does the first of the two objections to machine production noted in this chapter result in waste of human energy? Why is the second objection illogical?

READING REFERENCES

1. Brookings, Robert S. Industrial Ownership, "Management now a trustee," chapter II.
2. Chase, Stuart and Schlink, F. J. Your Money's Worth, "Standardization—Good and bad," chapter IX.
3. Johnson, Joseph French. We and Our Work, "Our factories and our work," chapter III.
4. Myers, C. S. Mind at Work, "Restriction of output," chapter IV.
5. Taussig, F. W. Principles of Economics, vol. I, revised edition, "Some causes affecting productiveness," chapter 7.
6. United States Department of Commerce, Bureau of Standards. Elimination of Waste—Simplified Practice. What It Is and What It Offers. (Pamphlet)

CHAPTER XI

Human Development as a By-Product of Maintaining Standards of Quality in Production

It has been observed that workmanship may be good or bad and that power may be exerted constructively or destructively; that is, quality in production varies. It is understood also that work may produce many or few articles; that is, quantity in production varies. Changes in quality and quantity production are constantly taking place. A foundry will seldom produce the same tonnage on successive days, and quality is a matter of constant concern to any organization producing for the markets.

This change in the quality and quantity of goods produced and consumed is closely associated with the development of the three main factors in industry—materials, equipment, and man. Attention has been called to the fact that in the past the major emphasis has been upon the improvement of the first two factors and that the consideration given the third is increasing.

Mental and Moral Forces in Industry

The last paragraph of the Preface to *Waste in Industry* expresses the view on this point of representatives of the engineering professions. It is quoted below.

¹ "This report is the first work undertaken by the American Engineering Council in rendering public service. It discloses losses and waste due to the restraint and dissipation of the creative power of those who work in industry. It lays the foundation for knowledge of the destructive influences which have too much controlled in the past. From this knowledge will grow the conviction that mental and moral forces must be added in a much larger degree, to the physical resources now employed if industry is to serve all who are dependent upon its continuous and effective operation."

¹ *Waste in Industry*, p. vii.

The United States Chamber of Commerce in a recent investigation learned that 500 or more manufacturers maintain laboratories for industrial research and that about 70 other trade associations are correlating the research efforts of many plants. Seventy million dollars has been estimated as the amount spent annually by American manufacturers in laboratory research.

Recently, Herbert Hoover, when he was Secretary of the Department of Commerce, assumed the leadership in a movement in America to raise a fund of twenty million dollars to be used in scientific research. It is significant that the particular field in which this research is contemplated is that which scientists know as pure science. By this is meant the search for new fundamental facts without concern for their immediate application. For instance, the search for new metals and gases and the study of their properties are in the field of pure science. The study of the production of helium in quantity and its use in air craft service might be the object of a study in applied science following the research in pure science.

Scientific Research Exceeds Application

Chemists working in the great laboratories of the world have discovered a number of metals which are as yet unknown to industry in general. More than twice the number of metals are known to scientists than are in common use. These latter are being constantly experimented with in expectation of finding their application to human needs.

Steel and aluminum are comparatively recent discoveries. The use of these two metals has stimulated industrial progress immensely and carried with it upon the wave of human service many men from the workshops and factories to positions of wealth and fame.

As in the case of steel and aluminum, any one of these new metals may suddenly be found to be widely useful. In fact, a number are coming into use at present and are producing great changes in industrial methods. Young Americans who

choose industry as a means of making a livelihood and are alive to the wonders of evolution in production will be amply repaid for their interest.

Reward through Human Service

Happily, it is possible for producers to be also inventors and discoverers. Most of the progress of the race has been the result of one small improvement after the other. There is more certain advancement in the improvement of one small operation in foundry work or, for that matter, in any other industry than in numerous random experiments which may or may not result in a new process of manufacture. The reward for these slight improvements has always been greater than the reward so justly deserved by persons who have been successful in initiating fundamental departures in manufacture and distribution. This is the natural result of hesitation of the average person to accept innovations. Scientists who spend lifetimes searching for new facts realize the probabilities are that they will have grown old in service before the world will reward them for their contributions. The true scientist does not take into account possible rewards. Marcus Aurelius describes such a person as the third man, the one who is unselfish in his service.

¹ "One man when he has done a service to another is ready to set it down to his account as a favor conferred. Another is not ready to do this, but still in his own mind he thinks of the man as his debtor, and he knows what he has done. A third in a manner does not even know what he has done, but he is like a vine which has produced grapes, and seeks for nothing more after it has once produced its proper fruit. As a horse when he has run, a dog when he has caught the game, a bee when it has made its honey, so a man when he has done a good act does not call out for others to come and see, but he goes on to another act, as a vine goes on to produce again the grapes in season. Must a man then be one of these, who in a manner acts thus without observing it? Yes. What

¹ From Elbert Hubbard's Scrap Book.

more dost thou want when thou hast done a man a service? Art thou not content that thou hast done something comfortable to thy nature, and dost thou seek to be paid for it, just as if the eye demanded a recompense for seeing, or the feet should demand a recompense for walking?"

It is a peculiar fact, however, that unselfish human service is absolutely certain of reward. Bruce Barton, in *The Man Nobody Knows*, interprets Jesus as teaching that he who would save his life—that is, save himself from obscurity, must first lose himself in his work. In other words, the surest way to win recognition from others is to forget ourselves in our work. This probably explains why workmen who improve operations are so generally rewarded. Certainly, they are sure of recognition when they are most interested in the job.

Quality Depends upon Specifications

Quality is always rewarded, for it is always defined in relation to requirements. The word specifications may be substituted for requirements, and we may say that quality depends upon specifications. Since the demand for an article must precede specifications, it follows that the original definition of quality comes from the demand. This is a very important fact for those persons who enter industry with a view to finding their life work in this field. New employees will be saved much misunderstanding if they appreciate the full significance of these characteristics of quality.

In the introductory chapter to *The Principles of Iron Founding*, Dr. Richard Moldenke tells of the Russian Moujiks. "These primitive artisans can be found in cellars in Moscow and other old Russian cities fashioning in wax statuary of Cossacks in wild rides, treasure boxes, armor, and other artistic objects, with life-like fidelity." The "lost wax" process of primitive times is used. A clay mold is formed about the model and the wax is melted out. The artistic ability and painstaking hand labor of the Russian peasant without doubt produces more refined statuary than would

be expected from an American foundry accustomed to producing automobile cylinders.

Quality to the Russian peasant molding statuary in the cellar of his home is one thing, and quality to a molder of automobile cylinders for American production is quite another. The chances are that the iron which goes into the automobile cylinder is of a grade much superior to that which forms the statuary. A molder who had spent many years molding statuary under the conditions mentioned above would have difficulty holding a job in the average commercial foundry, and the reverse would be equally true.

The standards of quality and quantity in printing and bookmaking—in fact, in all industries, depend upon the requirements of the service for which the products are intended. The standard for gift books, for instance, requires unusually fine paper and artistic binding. One would not expect to receive the same kind of a book from the average print shop as might be expected from publishing companies specializing in artistic production.

Heroes in Industry

It is unfortunate that many of the stories of the lives of successful men emphasize instances wherein they spent long periods of time in order to produce a few masterpieces of workmanship. The world needs men who have the patience and ability to work for years to develop an idea, carve a beautiful statue, paint an inspiring picture, or produce the lens for a great telescope. The world needs also many more men who can, with machinery, shape the wood for the furniture we may need and make the millions of feet of lumber to build homes. We need men who have the skill and understanding necessary to paint our homes and other buildings, ships, bridges, and machinery. Their work has saved and will continue to save the world untold wealth through the preservation of materials. If it were not for these painters, the cost of living would be multiplied. Our very civilization is dependent upon the great army of workers who produce and distribute the fundamentals of life.

We may gaze in wonder upon Michelangelo Buonarroti's statue of Moses and find little to interest us in the man Michelangelo. When we learn that Michelangelo studied anatomy twelve years, labored as a stonecutter and afterward spent years in laborious practice before undertaking one of his famous statues, we become interested in the man himself.

¹ Romain Rolland, in his biography of the great artist, says: "He wasted years in quarries selecting his blocks of marble and making roads along which to carry them. He wanted to be everything—engineer, workman, stonecutter." Perhaps Michelangelo did not waste the years that Rolland considers wasted. Who knows how much of the success of the great artist may be traced to the quarry? Michelangelo was probably recognized as a first-class stonecutter. His daily production was doubtlessly as good as the average. Certainly, he would not have been justified in polishing a building stone as he would a great statue any more than we are justified in using handmade articles merely because they represent a more laborious practice.

Conspicuous Consumption and Human Welfare

Persons may yet be found who maintain their interest in hand craftsmanship merely because it is such. Veblen discusses this as the theory of "conspicuous consumption." According to this theory, certain persons are willing to pay for handmade articles simply because they represent greater expenditure of energy and resources. These people desire to parade their ability to purchase unusual articles and so turn, in many instances, to handwork as a means of expressing their desire for display.

This is a perversion which results in waste. This perversion is by no means confined to the pretentiously rich. Many working men and women show by various extravagances their desire to be conspicuously extravagant. Well-balanced persons show their understanding of the laws of progress and civilization by their willingness to make use of inventions and

¹ Introduction to Life of Michel Angelo. E. P. Dutton & Company, 1912.

labor-saving machinery without the conspicuous consumption which means waste. Quality should be defined upon a basis of the usefulness of the product in relationship to the comfort of those who use it.

INTEREST QUESTIONS

1. What is quality production?
2. Which is the better workman—one who finishes every job better than specifications or one who is sure just to meet the specifications? Why?
3. What is handwork?
4. Name ten outstanding developments in industry each of which is associated with changes in quality and quantity.
5. How can a new product be said to have its quality determined by demand? Give an illustration.
6. Mention a material which is used under more than one name.
7. What uses are made of experimental and test laboratories?
8. What experiments do you believe would be useful in an industry with which you are acquainted?

READING REFERENCES

1. American Engineering Council. Waste in Industry, "Purchasing and sales policies," chapter XVII; last paragraph of Preface, page vii.
2. Beatty, A. J. "Economics for employees," page 5, paragraphs 3-4, Report of Committee on Economics for Employes, American Management Association, 1924.
3. Dewey, John. How We Think, "The analysis of a complete act of thought," chapter six.
4. Ruskin, John. Ruskin's Views of Social Justice, "Maintenance of life: wealth, money and riches," pages 41-46.
5. Slosson, Edwin E. Creative Chemistry, "Metals old and new," chapter XIV.
6. Spring, LaVerne W. Non-Technical Chats on Iron and Steel, second edition, "A general glimpse ahead," chapter V.

CHAPTER XII

Looking at Life through the Job—Job Pride and Mutual Confidence in Industry

Production Depends on Interest

A rapid increase in the number of occupations among which a person may choose has occurred in recent years. Many a youth has tried more jobs before he is twenty-five than his father had throughout life. This increase in the variety of occupations will continue as our industrial life becomes more specialized and more complex. It is a natural result of the industrial changes we have been considering.

Many sincere persons, among whom are leading economists, sociologists, educators, and writers, are greatly concerned about what Thomas Nixon Carver calls "political and social tendencies."

¹ "Some of the deepest students of political and social tendencies have come to doubt whether democracy can ever develop to a high stage of efficiency except among people who are in the main self-employed. It is true that modern democracy arose first in the cities and towns, but it is likewise true that at that time the cities and towns were the homes of self-employed men. Before the rise of the factory system such manufacturing as was done was carried on in small shops by craftsmen who were in the majority of cases self-employed. The rural districts, however, were under the feudal system. Conditions are exactly reversed at the present time. Under the factory system the great majority of people in the indoor industries work under bosses."

Foremen Should Interest Workers

Dr. Dewey, in "Human Nature and Conduct," contributes the following:

¹ Principles of Political Economy, p. 217, published by Ginn and Company, 1919.

¹ "An increasingly large portion of economic work is done with machines. As a rule, these machines are not under the personal control of those who operate them. The machines are operated for ends which the worker has no share in forming and in which as such, or apart from his wage, he has no interest. He neither understands the machines nor cares for their purpose. He is engaged in an activity in which means are cut off from ends, instruments from what they achieve. Highly mechanized activity tends, as Emerson said, to turn men into spiders and needles. But if men understand what they are about, if they see the whole process of which their special work is a necessary part, and if they have concern, care, for the whole, then the mechanizing effect is counteracted. But when a man is only the tender of a machine, he can have no insight and no affection; creative activity is out of the question."

American Methods Are Better

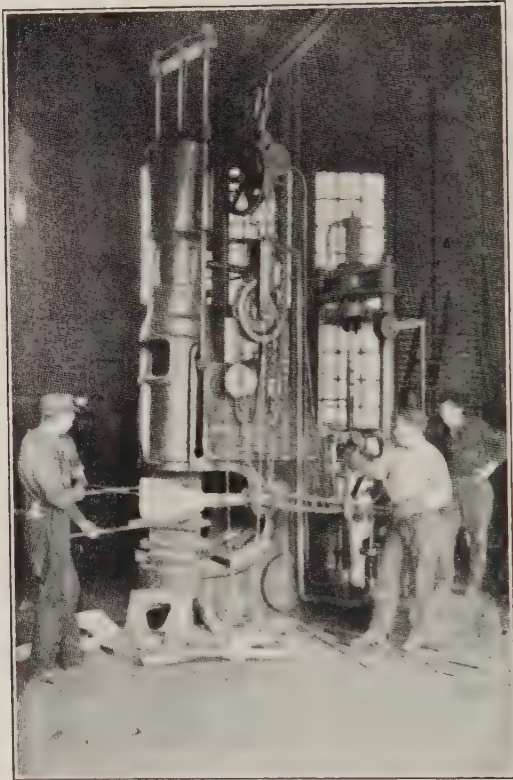
We turn from the economist and philosopher to obtain a journalistic view of the matter. William Allen White, in a magazine article entitled "Cheer up, America!" drew interesting comparisons between industrial methods of modern Egypt and modern America.

His observations were of an excavation for a building at the corner of Thirty-second and Thirty-third Streets and Park Avenue, New York City, and of an ancient temple near Luxor, Egypt. Of the American method he observed that ² "The foremen were not distinguished from the workers in either clothing or in the manner of their occupation. They all worked; no man idled. Few gave orders. The orders were reasonably polite." Of the Egyptian method, he says:

"The foreman, turbaned and draped in long dark skirts, stood over the youths, yelling at them, cursing them, urging them to their task. They, watching the tail of his eye with snakelike cunning, did as little clawing in the earth as possible,

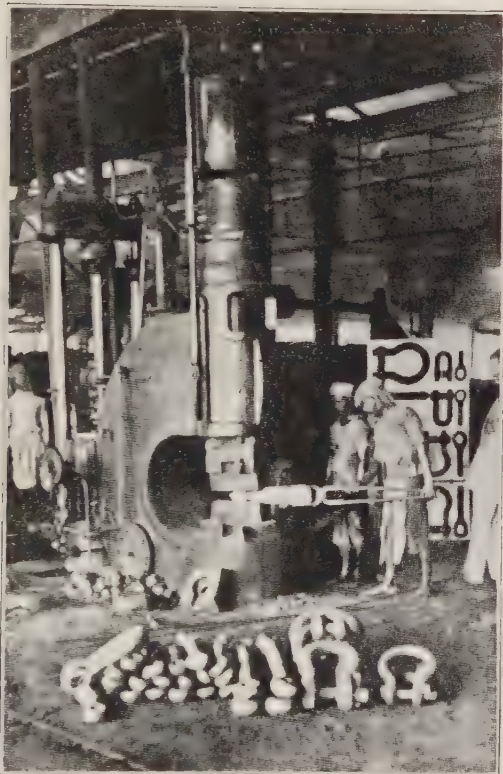
¹ Human Nature and Conduct, pp. 143-144, published by Henry Holt and Company, 1922.

² Harper's Magazine, March, 1927, pp. 405-406.



American production is greater than Hindu production because American workmen produce with greater comfort.
Courtesy of United Engineering and Foundry Company, Pittsburgh, Pennsylvania

filled as few leaky baskets as possible, under which their comrades groaned as they carried them out of the excavation. Occasionally, and when a white man came along, to emphasize the abysmal difference yawning between the foreman and the workers, the turbaned man cracked his whip and let the lash fall upon the naked back of some boy who jumped and winced and began to claw eagerly in the earth. Another foreman, or superintendent, much more gorgeously turbaned, much more splendidly robed, sat aloof, as far from the slave driver as the slave driver was from his prey ”



Same size press as shown in preceding illustration in operation in India. Note the absence of shoes and lack of comfortable clothing.
Courtesy of United Engineering and Foundry Company, Pittsburgh, Pennsylvania.

American Industry Must Go Forward

Mr. White concludes that "Somewhere in the contrast between those pictures lies all that is worth while in America."

It is encouraging to note the tone of hopefulness which Mr. White sounds, and it is clear to students of economics that a few leaders in this field share these views. Horace B. Drury, formerly of the Department of Economics and Sociology, Ohio State University, writing on the subject, "Labor and production," argued for a larger responsibility upon the part of workers in production. He said:

¹“If labor cannot be expected to interest itself in production unless it participates in the gain, neither will the public be willing that labor share actively in the management and rewards of industry, except as it becomes evident that such a rearrangement of things will mean more goods, greater welfare, and a sounder industrial system. For labor or any group of men to imagine that they can overturn or modify the existing system unless something better is built up in its stead would be the height of folly.”

Mutual Understanding Needed

Mr. A. K. Lewis, Director, Personnel Service Division of the American Rolling Mill Co., mentions the lack of understanding which has grown up in industry:

“Of late years we have been hearing much of unhappy relations between workmen and their employers. At this very time when ‘more production’ is the only thing that can reduce the cost of living, thousands of men are idle. What is the reason? The one outstanding thing that is most responsible is a lack of understanding between employer and employee.

“Now this condition did not always exist. There was a time, back in the very beginning of the modern industrial period, when shops were small; when the few men working in one would not only know each other and their employer intimately (oftentimes having grown up from boyhood days together) but their families knew and had an interest and affection for one another. With the development of the steam engine and power machines, a change gradually took place. Shops grew into manufacturing plants where large numbers of men, strangers to each other, worked side by side.

“The close ties, born of common interests and understandings, grew weaker year by year until, about twenty or thirty years ago, they seemed to be almost severed. In this country the minds of the leaders in industry had been so intent on

¹ The Annals, September, 1920, p. 83.

perfecting machines and processes of manufacture to increase production that the friendly relations between management and men were allowed to grow cold. A general mistrust took the place of the old neighborliness.

Welfare Work vs. Mutual Respect

"Then came an awakening. The importance of this matter began to be realized and a wave of personal service activities under various names swept over the country. Many ideas were advanced, the originators of which believed that they had found a cure-all, a panacea, for all discontent in the industrial world. 'Welfare Work' as these activities came to be known, grew to be more or less of a fad and the manner in which it was often administered caused resentment instead of gratitude—ill-feeling instead of good-will.

"Other men, understanding better the laws of human relations, realized that before men could work together to their best advantage, respect for each other and for each other's opinion was necessary; that there must be confidence before coöperation; and that confidence can come only with understanding. These men, therefore, were guided by these basic principles in the steps they took to create that spirit of coöperation that should exist in the mutual interest of all."

Human Service vs. Personal Kindness

Charles Wesley Wood, a journalist, like Mr. White, summarizes the possibilities of this materialistic civilization peculiar to America. No one who has followed the literary activities of Mr. Wood during the past five years will credit him with being biased in favor of employers. He is a severe though clearly sincere critic of present business methods. His *Myth of the Individual* deserves to rank with some of the best recent criticisms of American life. Furthermore, Mr. Wood is able to draw upon a rich experience as a worker in the ranks. These facts add weight to his opinions:

¹ "I see no sense in urging human beings to be kind and generous and sympathetic. We have much more kindness and generosity and sympathy in the world to-day than we know what to do with. This so-called age of capitalism has been an age of unprecedented tenderness. It has been an age of charity and philanthropy and of heroic self-sacrifice. I will grant that it has been an age of luxury too, a 'materialistic' age and an age of vulgar ostentation. People have built hospitals, no doubt, in order that they might gain a reputation for goodness, and the sons of the wealthy have enlisted as privates that they might become known for their democracy. Nevertheless, if one will honestly contrast this age of 'materialism' with any of the more 'spiritual' ages that preceded it, it must stand out as an age in which one of the greatest driving forces in human conduct has been the desire to alleviate pain; and not merely among one's own kinsmen either, but among people of distant lands whose sufferings might easily pass unnoticed."

Job Pride and Self-Respect

Unless a man is on the job of which he feels himself a real part he cannot, however, fully attain happiness for himself nor render service to others. The choice does not depend entirely on the job nor on the man but also on the man's ability to make the job his own. Why then, may we not ask, should not workers in industry feel a share of pride in the building of hospitals and in other philanthropic enterprises which grow out of industrial earnings? Certainly, no employer would object. Such pride in achievement is merely a matter of constructive mental attitude.

The job should be recognized as a telescope through which realization of our ambitions may be seen. If a man cannot see in his job the realization of some of his most earnest desires, then something needs to be changed. It may be the man, or the job for the man, or just the man's understanding of the possibilities in his present job. Each of us

¹ The Myth of the Individual, p. 213, published by the John Day Company, 1927.

Looking at Life through the Job

has a responsibility to discover why we lack job pride, if we do not possess this to the extent that makes possible real satisfaction in daily work.

Job Pride and the Will to Work

Mr. R. B. Wolf, discussing "Self-expression in industry," in a pamphlet entitled *The Human Relations in Industry*, issued by the Associated Industries of Massachusetts in 1919, said:

"A man in order to work willingly must work because he desires to work from within, not because he is forced through economic pressure to carry out orders given by others. I believe it to be absolutely essential that as manufacturers we use the same degree of intelligence in obtaining a working knowledge of the principles of human nature that we do in the working out of the scientific principles of the manufacturing process. The need is even greater—for civilization itself will be destroyed if humanity's efforts are not constructively directed. . . .

"We have had ample demonstration that the lack of interest and present disinclination upon the part of the workers to produce cannot be cured by more wages or shorter hours . . . The big problem is how to create an environment in our factories so that men will become so interested in their work that their main thought is not going to be for quitting time and pay day."

In order to realize our ambitions through our present jobs, we must take pride in our daily work. In other words, job pride is a stepping stone to success in any venture. It is clear then that a worker without ambition will be without job pride. It is just as clear also that any worker who has a worthy ambition may be led to take pride in his work—provided he understands the relation between his ambition and his job.

Ambition and Job Pride

Emerson said: ¹ "You admire this tower of granite, weathering the hurts of so many ages. Yet a little waving hand built this huge wall, and that which builds is better than that which is built. The hand that built can topple it down much faster. Better than the hand, and nimbler, was the invisible thought which wrought through it; and thus ever, behind the coarse effect, is a fine cause, which, being narrowly seen, is itself the effect of a finer cause."

Whether a tower of granite or a piece of machinery, it is the result of thinking and every constructive human achievement should be a source of justifiable pride.

We must understand that ambition is seldom centralized. In fact, ambition is like the spokes of a wheel reaching out in all directions.

All these ambitions must revolve around our present job if that job is to contribute as it should to the achievement of our ambition. It is evident then that if our ambitions do not revolve around our present work, either the ambition or the work should be changed in order that we may succeed and industry be advanced.

Job Pride and Advancement

No one doubts which two of four men will make the best workers in the production department of a factory. If A desires to become a professional band leader, B hopes to become an expert accountant, C is studying and looking forward to advancement in his present employment, and D wants to be sure of a good job which will enable him to buy his home and care for his family. D may have just as much job pride as C and the shop records of C and D over a period of years will be sure to be better than those of A and B.

Mr. Paul W. Litchfield, President, The Goodyear Tire & Rubber Company, presents in a very matter of fact way his

¹ Emerson's Essays, "Circles."

views of this relationship in his book, *The Industrial Republic*:

¹ "It is, of course, true that there will always be an undesirable minority of employees in any industry, the same as there are undesirable inhabitants in any country. These perform an economic function, as industry cannot always employ the same number of people, and must give opportunities of advancement from time to time. As advancement is a relative term, there must be some who do not move up, and these naturally belong to the class which does not wish to be fair and productive. As the needs of industry for labor vary, steady employment to those trying to do their best can be provided only by laying off those who have not earned steady employment. It should not be the duty of any particular industry to provide steady employment or advancement for these latter, but there is always a distinct duty that the industry do everything possible to educate and assist such workers to change their ways and produce and save, becoming good citizens of the industrial republic.

"The world does not owe every man a living, but it does owe every man the opportunity to earn a living, and each industry as a duty should do its share in affording men the opportunity to earn that living up to its ability to do so."

Work as a Means to Happiness

Since ambitions and job pride are so closely related, it appears that one of the first things we ought to consider is our chief ambitions. What do we want to do five or ten years from now? Too many of us neglect to state this plainly even to ourselves. Too few of us have a definite goal toward which we are working. Each, however has a hazy sort of indefinite goal which in most instances leads beyond our horizon and we are literally like the fellow who "is on his way but doesn't know where he is going."

¹ *The Industrial Republic*, pp. 70-72, published by Houghton, Mifflin Company, 1920.

This question of making a choice of means of obtaining happiness—of gratifying the inner urge for human satisfaction—is the cause of most of the unusual departures in human affairs. Great wars have been fought and nations have been plunged into hardship in an effort to find a royal road to happiness in work. It is one thing to appreciate a human need and quite another to satisfy it. Sincerity and human need are not all that is required to improve conditions.

Work Devoid of Interest Is Degrading

Mr. Bertrand Russell would not by the greatest stretch of imagination be considered a conservative supporter of present industrial methods, but it is interesting to observe his graphic account of his experiences in Russia where the bolsheviks have attempted their experiments in social development. His description should cause some of us to take heart in our conviction that we are proceeding in the right direction when we begin here and now to encourage human happiness through developing pride in connection with our work. Mr. Russell says:

¹ "It was on the Volga, in the summer of 1920, that I first realized how profound is the disease in our Western mentality, which the bolsheviks are attempting to force upon an essentially Asiatic population, just as Japan and the West are doing in China. Our boat traveled on, day after day, through an unknown and mysterious land. Our company were noisy, gay, quarrelsome, full of facile theories, with glib explanations of everything, persuaded that there is nothing they could not understand and no human destiny outside the purview of their system. One of us lay at death's door, fighting a grim battle with weakness and terror and the indifference of the strong, assailed day and night by the sounds of loud-voiced love-making and trivial laughter. And all around us lay a great silence, strong as death, unfathomable as the heavens. It seemed that none had leisure to hear the silence, yet it called to me so insistently that I grew deaf to the harangues of propagandists and the endless information of the well-informed.

¹ From *Problems of China*, published by The Century Company.

"One night, very late, our boat stopped in a desolate spot where there were no houses, but only a great sandbank, and beyond it a row of poplars with the rising moon behind them. In silence I went ashore, and found on the sand a strange assemblage of human beings, half-nomads, wandering from some remote region of famine, each family huddled together surrounded by all its belongings, some sleeping, others silently making small fires of twigs. The flickering flames lighted up gnarled, bearded faces of wild men, strong, patient, primitive women, and children as sedate and slow as their parents. Human beings they undoubtedly were, and yet it would have been far easier for me to grow intimate with a dog or a cat or a horse than with one of them. I knew that they would wait there day after day, perhaps for weeks, until a boat came in which they could go to some distant place in which they had heard—falsely perhaps—that the earth was more generous than in the country they had left. Some would die by the way, all would suffer hunger and thirst and the scorching midday sun, but their sufferings would be dumb. To me they seemed to typify the very soul of Russia, unexpressive, inactive from despair, unheeded by the little set of westernizers who make up all the parties of progress or reaction. Russia is so vast that the articulate few are lost in it as man and his planet are lost in interstellar space. It is possible, I thought, that the theorists may increase the misery of the many by trying to force them into actions contrary to their primeval instincts, but I could not believe that happiness was to be brought to them by a gospel of industrialism and forced labor."

Chasing Rainbows in Industry

Every country has its quota of citizens who are always chasing the rainbow of foreign possibilities. Lately numerous individuals who have visited Soviet Russia have been urging the benefits of that system of government. These heralds of different systems are by no means confined to Soviet sympathizers. This tendency seems to be common to many tourists. It is possible that their unusual experiences of travel emphasize

foreign observations. This conclusion is given additional weight in view of the reported expressions of some foreign tourists who return to their homelands from America praising some feature of life here which many Americans are quite anxious to change.

Certainly, we in America should appreciate the many possibilities for improvement through pursuing methods which have been demonstrated elsewhere to be of value. Critical comment is always helpful. But we should not allow occasional achievements to blind us to foreign difficulties nor our immediate opportunities. There is one thing every worthwhile engineer knows which he can use on every job. He knows that regardless of his destination, there can be but one point of departure. He must begin where he is. He must start where he stands.

Ambitions and Interests

If we are to start where we stand in developing job pride, we must take into account two variable factors: Our ambitions and interests.

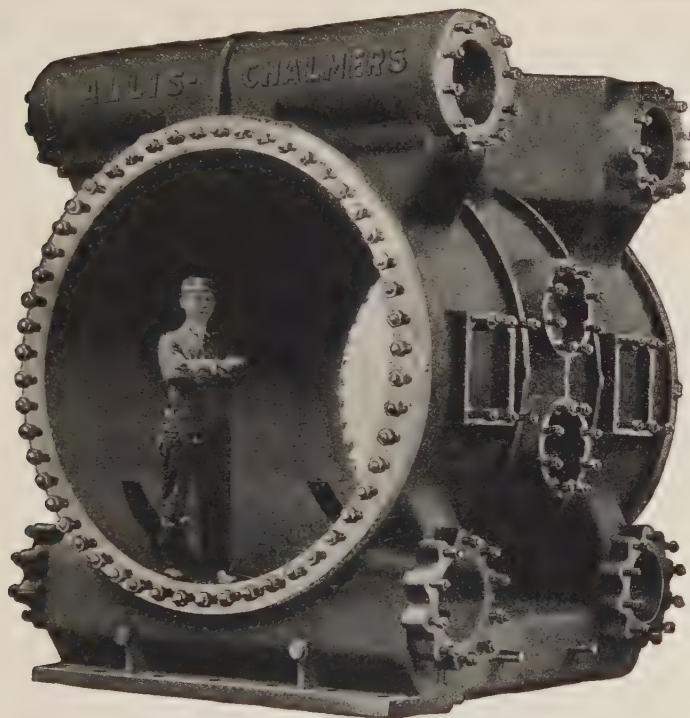
We should reflect upon our ambitions and interests. These will sometimes be directly opposed. Sometimes the interest may lead away from any productive activity as in the case of a young employe who may have an ambition to become wealthy and have an interest in gambling.

When we have decided what are our chief ambitions, we should reflect whether or not they can be realized through our job. We should study our principal interests and decide whether they will interfere with or contribute toward the achievement of our ambitions.

If the interests are in keeping with the ambition and the ambition can be seen through our present work, our opportunity is clearly to do everything in our power to increase these related interests.

Job Pride and National Security

All this discussion of pride in production is very closely related to national progress and industrial economy. On every



This young man is proud of his part in this job.
Courtesy of Allis-Chalmers Manufacturing Company, Milwaukee, Wisconsin.

hand, we may see the economic advantages of pride in achievement. From Eli Whitney to Henry Ford, the highway of American prosperity has been marked by pride in achievement. Mr. Ford sounds the note of confidence we need to hear when in the midst of the distractions of complex industrial and business life. In the introduction to *My Life and Work*, he says:

¹ "There is little chance of an intelligent people, such as ours, ruining the fundamental processes of economic life. Most men know they cannot get something for nothing. Most men feel—even if they do not know—that money is not wealth. The ordinary theories which promise everything to everybody,

¹ *My Life and Work*, p. 8.

CHAPTER XIII

Time Studies Essential to Stabilized Employment—Standards of Produc- tion as a Basis for Mutual Understand- ing in Industry

When is one agreeable? A number of answers could be given to this question. But one thing is certain—one will never be agreeable until he is able to agree. In other words, being agreeable is not merely the act of saying so. We have become accustomed to associate a smile with an agreeable disposition and yet one may smile most disagreeably.

This suggests that if we are to know when and where and how to act agreeably, we must know the why of these things. In other words, agreeableness is based upon understanding.

How is a workman to be agreeable in the average industrial situation if he does not understand some of the fundamental difficulties and satisfactions of owners and managers? How is a manager to be agreeable if he does not see the difficulties of workers? Can the owner really be able to agree with managers and workers unless he understands their problems? Let us take an example of an industrial practice which has throughout modern industrial development been one of the most prolific causes of unrest. Time studies furnish a significant illustration. In order to establish costs, it is absolutely necessary to make time studies. There is no other way to assign costs accurately to their proper places in operations and processes.

Time Studies and Industrial Relations

There is a mistaken idea in the minds of some workers and of less experienced foremen that time studies are necessary only in case of piece rates, or premium or bonus plans. Henry Ford in his book, *My Life and Work*, mentions the necessity of time studies as a basis for fair wage and production standards:

¹ "A great deal of inequity creeps into wage rates unless both the employer and the employee know that the rate paid has been arrived at by something better than a guess. Therefore, starting about 1913 we had time studies made of all the thousands of operations in the shops. By a time study it is possible theoretically to determine what a man's output should be. Then, making large allowances, it is further possible to get at a satisfactory standard output for a day, and, taking into consideration the skill, to arrive at a rate which will express with fair accuracy the amount of skill and exertion that goes into a job—and how much is to be expected from the man on the job in return for the wage. Without scientific study the employer does not know why he is paying a wage and the worker does not know why he is getting it. On the time figures all of the jobs in our factory were standardized and rates set.

"We do not have piece work. Some of the men are paid by the day and some are paid by the hour, but in practically every case there is a required standard output below which a man is not expected to fall. Were it otherwise, neither the workman nor ourselves would know whether or not wages were being earned. There must be a fixed day's work before a real wage can be paid. Watchmen are paid for presence. Workmen are paid for work."

High Wages Come Only through Economic Production

Otto H. Kahn in an address delivered December 12, 1922, and later published by the Committee of American Business Men, sets forth the views of the progressive investor regarding the mutuality of interest in economic productions:

"Labor is entitled as a matter of course, to receive its fair share in the fruits of industry, not merely by way of an adequate return in wages, but of an adequate return also in the comforts, interests and recreations of life, in those less tangible things which make for contentment, peace of mind and happiness.

¹ *My Life and Work*, pp. 125-126.

and demand nothing from anybody, are promptly denied by the instincts of the ordinary man, even when he does not find reasons against them. He *knows* they are wrong. That is enough."

"We Get What We Give"

In Mr. Ford's opinion, the present system of production and distribution could be greatly improved. On the other hand, he points out that it does work which after all is the important consideration. Like most well-balanced persons, Mr. Ford believes that present methods will gradually be succeeded by more effective ones. In this particular part of *My Life and Work*, Mr. Ford endeavors to tell exactly why bolshevism must fail. It is to be regretted that he fails just here to be sufficiently clear in his definitions. After saying that bolshevism must fail because it is uneconomic, he fails to define clearly what he calls "the economic fundamental" by merely saying that the "economic fundamental is labor." Such a definition is too inclusive to be clear. The fundamental was implied much more clearly in the earlier statement (which sounds much more like Henry Ford) that "Most men know they cannot get something for nothing." Therein is found the fundamental of economy and therein also is found the reason for the failure of the bolsheviki. Our present system of production and distribution is based upon a profitable exchange of economic goods and, in the broadest sense, an economic good is anything produced by anybody to satisfy a human want. America and Russia each have wants to satisfy. It is reasonable to assume that to some extent, at least, production follows the same general rules in all countries. For example, wheat is raised in about the same manner. The difference is in the manner of exchange wherein our business system, imperfect as it may be, offers the incentive which is lacking today in Russia. Pride in achievement and profitable exchange are after all very closely related.

If a person sees the work he enjoys as a part of the great stream of productive activity, he will be eager to modify his

ideas, his methods, even his production standards in order to maintain his standards of service. There is no more tragic sight than a person dominated by a job pride that served in the past but which hinders today. The opportunity is growing for every worker to participate in the improvement of the operations and processes involved in his daily work. This leads to a dynamic kind of job pride. We in America must not make the mistake of lessening production incentives; rather, we should continually increase them if our present system is to continue to function. But we must find a way to produce agreeably.

INTEREST QUESTIONS

1. What is pride?
2. Give an example of three different kinds of job pride and mention the effects of each on the worker's happiness and his value in industry.
3. What is the difference between personal pride and job pride?
4. What is the relationship between quality of product and job pride?
5. What is the difference between job pride and interest in a job?
6. What is your goal in life?
7. Draw a plan of your life for the next ten years, setting up yearly goals and taking account of the handicaps to be overcome in the achievement of each goal.

READING REFERENCES

1. Cowdrick, E. S. *Manpower in Industry*, "The training of the workman," chapter XXI.
2. Shearman, Henry P. *Practical Economics*, first edition, chapter IV, especially pages 41-47.
3. Smith, Henry Louis. *Your Biggest Job*, "A neglected art," chapter IV.
4. Wilson, Woodrow. *When a Man Comes to Himself*.

"On the other hand, the workingman must realize that high wages can only be maintained if a high rate of production is maintained. The restriction of production to a uniformly low level per man, with a view to creating positions for more men, is a sinister and harmful fallacy, most of all in its effect on labor.

"Even the official organ of the bolshevist regime in Russia announced recently that 'increased production is not only the imperative duty but the imperative interest of the proletariat'."

Time Studies Stabilize Employment

Any company which neglects time studies of some accurate nature is certainly treading upon dangerous ground. Most emphatically also a company which wholly neglects time studies is not a safe company to work for. Time studies are fundamental to cost control and cost control is in turn fundamental to stabilized employment which is accepted by all thoughtful industrialists as essential to effective and permanent industrial relationships. In view of all these prerequisites to agreeableness in industry and to individual happiness, we witness continual manifestations of dissatisfaction over the making of time studies. The appearance of the time study man with a stop watch and record book is a signal for the average worker to be on his guard. It is a good omen to observe that in some places this attitude has been greatly changed, and one large industrial organization reports a remarkable condition of affairs wherein workers frequently request time studies. This condition is rare in industry but this does not detract from the forcefulness of the illustration. Rather it furnishes opportunity for further study of methods of introducing industrial practices.

Why Time Studies Are Opposed

Why does this antagonistic attitude exist generally toward time studies when they are undeniably necessary to sound business administration and stabilized conditions of employment? It will do us no good to take the position of certain

socialists and answer that this attitude is a result of the selfish actions of many employers in the past whose only purpose in making time studies was to learn the exact time of each operation with a view to clipping seconds and minutes off the job by speeding up each separate operation. Neither should we waste our time trying to deny the truth of this statement. The argument of the destructive critic on the other side is equally valueless. He maintains that workers desire to loaf on the job, take two days to do one day's work and "get by" with the least service. There are loafers in every trade, profession, and occupation even in that of acting as monarch of a kingdom; but this line of reasoning does not lead anywhere in connection with the introduction of cost studies or other devices to make industry of greater service. Most assuredly, time studies have been used to reduce time on operations. Furthermore, no one will object to reducing time on operations if he is really interested in the business.

Time Studies and Mutual Interest

Let us assume, for instance, that one hundred workers own a factory and share equally in the profits of the business. If they are intelligent, they will take every precaution to protect their investments. Their product must compete in quality, price, and delivery with that of other factories; therefore, each separate article must be priced to meet competition and return a reasonable profit. In the very nature of things, such a situation calls for a time study as well as a very accurate understanding of all cost factors. The time study is necessary to learn the labor cost, find possible "leaks," and finally to set a safe selling price. Imagine one of these partners in the business objecting to a time study being made. On the contrary, such a partner would probably be requesting one if there were any doubt about his particular job bringing a profit. Furthermore, if this worker-partner knew a timing of each separate manipulation—that is, a highly detailed time study—promised a possibility of finding where certain operations could be shortened, he would probably be the first to request it.

Workmen Vitally Interested in Time Studies

Daniel Bloomfield in his book, *Financial Incentives for Employees and Executives*, Volume I, says:

¹ "So far as the workman is concerned, the most vital factor in administration is the equitable determination of the time corresponding to satisfactory performance. Whether this time be used in the determination of a piece-work price, a bonus or premium system schedule, or the judgment of the supervising officer upon the matter of whether the workman has succeeded or failed to deliver satisfactory performance under day-work, the determination of this time is all important. If it is low under the piece-work system, the resulting piece-work price will inadequately compensate the workman. So also in the case of the bonus or premium plan, while under the day-work system, the workman may be unfairly criticized by the supervisor. If too liberal, an unfairly large piece-work price will result, which, according to experience under the piece-work system, is subsequently adjusted, i. e., lowered. These adjustments have caused discontent. The same is also true with regard to the bonus or premium schedules, while under the day work system of operation, it results in a loosely operated, low efficiency shop.

"The time consumed in the satisfactory performance of any operation under given conditions can only be determined from some sort of a time study."

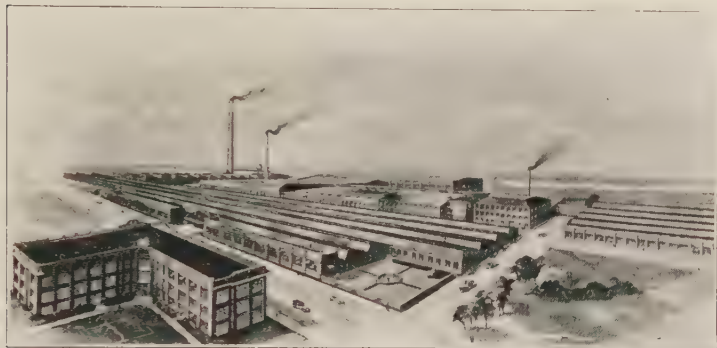
Time Studies Need No Defense

It should be remembered that this discussion of time studies is not intended as a defense of time studies as a basis for labor cost control. Time studies need no defense in a well-ordered manufacturing business. It should also be understood that time studies do not always depend upon the use of a stop watch and record book. When a worker makes out a job card, he is assisting in a time study. It will be recalled that time studies

¹ *Financial Incentives for Employees and Executives*, p. 9, published by The H. W. Wilson Company, 1923.

Time Studies Essential to Stabilized Employment

were introduced here merely as an example of destructive ideas which should be replaced by constructive ideas based upon understanding.



The making of time-keeping instruments has become a great industrial enterprise in America.

Courtesy of Western Clock Company, La Salle, Illinois.

Occasionally some one is heard to object to time studies upon the basis that "the making of the time study costs as much as the uneconomic practices it is intended to prevent." It should be understood that the purpose of time studies is not merely to prevent uneconomic industrial practices. Certainly, they should be justified upon this basis if no other existed. But it is not the only basis for time study. The broader basis is human justice and occupational selection. If a workman by studying his job and applying himself is able to prevent uneconomic practices he certainly should be rewarded for his achievement. Certainly, also, he should be considered as having earned advancement in the particular field in which he has demonstrated ability.

Time More Important than Money

While it is evident that the argument that "time studies waste money" is misleading it is in order to ask why one may not reasonably exchange money for other things which may to us seem more desirable? Thomas Nixon Carver gives expression to this idea in his book, *The Present Economic*

Revolution in the United States:

¹ "There is one sense and a rather important sense in which the American people are the most penurious in the world. They are penurious of time. No other country spends money so freely in order to save time as this country. There are some countries whose people will, on the average, spend a great deal of time in order to save a little money. We do precisely the opposite. We spend a great deal of money in order to save a little time. There may be some doubt as to which is the better form of parsimony. One can at least say that the country that is willing to spend a great deal of money in order to save time will probably have a great deal of money to spend; that is, it will be a very prosperous country. The fact that we are a country of this kind is one of the reasons why we are not only prosperous, but why there is a wide diffusion of prosperity among all classes. It should be a part of the higher strategy of labor to encourage this tendency."

Standards of Living and Standards of Production

W. A. Appleton, Secretary of the General Federation of Trade Unions of Great Britain discussing "Strikes, wages and values" in his book, *What We Want and Where We Are* says:

² "The formula, 'to everyone according to his needs' is an impossibility apart from its corollary, 'from everyone according to his capacities.'

"How to obtain from each his maximum production is a problem of eternity rather than time. For ten thousand years autocrats, economists and sociologists have variously regarded slavery, law and selfishness as applicable incentives, but to-day the contention of the sociologist appears to be uppermost. The right to possess and accumulate provides a greater inducement to effort than does knowledge of law or fear of punishment. The tendency (transient, of course) to appropriate for communal uses the fruits of individual efforts,

¹ *The Present Economic Revolution in the United States*, p. 199, published by Little, Brown, and Company, 1926.

² *What We Want and Where We Are*, p. 107.

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has already led to dangerous slackening on the part of many capable producers. They are electing to live upon capital rather than earnings, and unless this inclination is checked, there can be no real upraising of national well-being.

"The standard of living depends upon the standard of production. If the latter is low, the former cannot be high. The world abounds with proofs of the fact that the nation which produces little, enjoys little. If the miners refuse to produce coal, the poor have no fires. If the railwaymen refuse to carry goods, the poor have no food. What applies to the miners and the railwaymen, applies equally, though perhaps not so obviously, to the whole gamut of human enterprises and affairs."

Time Studies Test Industrial Relations

The very fact that the time clock and job card have to be continually enforced in the average factory is evidence that workers do not take a partnership interest in these time study devices. It is only the unusually well informed worker who understands that the time clock and time card are not merely devices for checking up on him and detecting his possible lapses from time schedules or violation of the rules. Indeed, there are even some foremen who seem to think time recording by workers is primarily intended as a device for controlling workers. Demagogues and uninformed leaders have encouraged this lack of understanding. There is great need for propaganda in the best sense regarding the fundamental truth that human development in industry and industrial development for human service are possible only through self-control and interest in accurate knowledge and control of operations and processes.

INTEREST QUESTIONS

1. Is it possible to be agreeable while refusing to coöperate? Explain.
2. Why does sickness in homes interfere with agreeableness in the factory?

3. Why does worry reduce effectiveness in production?
4. What production standards are dependent upon time studies?
5. How would you proceed to stabilize employment in a plant? an industry?
6. What is the difference between stabilizing production and stabilizing employment?
7. Why is stabilized production with stabilized employment sometimes referred to as an ideal industrial condition?
8. To what extent is the average worker in partnership with the owner of the business in which he is employed?
9. Describe a time study.
10. What are the special benefits to workers from time studies?
11. Why are time studies sometimes objectionable to workers? Are they useless when they are objectionable? Are they less useful when they are objectionable? Explain.
12. What costs are most intimately related to time studies? Why?
13. What is a partnership?
14. What are some of the differences between a highly detailed time study and one in which the beginning and end of a job are noted?
15. What special benefits may be derived from detailed time studies?
16. Give examples of time study carried on in the average shop or plant where time studies as such are seldom discussed.
17. Why is the plant where time studies are carefully observed likely to offer more permanent and better working conditions?

READING REFERENCES

1. Carver, Thomas Nixon. The Present Economic Revolution in the United States, Part II, "What capitalism is and does," pages 221-232.
2. Cowdrick, E. S. Manpower in Industry, "Importance of accurate understanding," pages 39-40.

Time Studies Essential to Stabilized Employment

3. Dewey, John. *Human Nature and Conduct*, "What is freedom?" part four, section III.
4. Dorsey, George A. *Why We Behave Like Human Beings*, Section 14, pages 464-471.
5. Everitt, Frank, and, Heywood, Johnson. *Cost Control for Foundries*, "Accounting for labor," Article 45, pages 60-63.
6. Frankel, Lee K. *Health of the Worker*, "Working conditions," chapter II; "Keeping the worker fit," chapter IV.
7. Houser, J. David. *What the Employer Thinks*, "Wage demands as expressions of resentment," "The proper importance of financial incentives," and "Individualism—A forgotten need," pages 144-148.
8. Johnson, Joseph French. *We and Our Work*, "The second partner—labor," pages 121-122.
9. Shearman, Henry P. *Practical Economics*, "Standardizing the best methods of manufacture," page 108.
10. Taussig, F. W. *Principles of Economics*, vol. I, revised edition, "Large scale production," chapter 4.
11. Taylor, F. W. *Shop Management*, pages 150-166.

CHAPTER XIV

Friendship versus Prejudice in Industry— Humanizing the Human Factor through Improved Methods and Equipment

New Methods Require New Men

Elsewhere in this series, the growth of the industrial system has been commented upon. Too often industrialists and those seeking more economical methods have centered their attention upon the development of equipment and of methods of controlling materials and have failed to consider the tremendous effect of these changes upon the human factor in industry. We must never lose sight of the principle that the human factor is an increasingly important element in manufacture, increasingly so because as equipment and methods are developed, there must be an increasing number of persons who will understandingly apply the new ideas.

Mr. Ford refers to this changing situation in the closing chapter of his book, *Today and Tomorrow*:

¹ "The coming of the industrial era, although it rapidly increased actual wealth, made a new problem in its distribution, and while it made the rich richer, at first it made the poor still poorer."

No New Patterns of Social Justice

Henry Ford ought to know as much about the effect of power production and specialization upon the human factor as anyone. He frankly admits that industrialists of three decades ago had little understanding of the trend of economic events. In his opinion, one difficulty with present-day industry is now, as it was thirty years ago, the result of inability of the average industrialist to think in terms of mechanical production. He said: "They thought in the old terms of hand production and many still think in those terms."

¹ *Today and Tomorrow*, p. 266, published by Doubleday, Doran and Company, 1926.

Mr. Ford, who has been considered by many as a sort of reformer, has his own ideas about the place of the reformer in industry. Apparently astonished, Mr. Ford adds, "Even reformers thought in the same terms." Why shouldn't they? Reformers are exactly what the word implies. There is never a new pattern of social justice in the sense of absolute justice to all units of society. The Golden Rule has never been improved upon. Social justice is now and probably always will be a goal for future achievements. There may be standards set up which indicate progress toward the goal, but these are no more patterns of social justice than a present-day automobile is a model of a future means of transportation.

Reformation and Progress

When we take a hat to the hatter to have it re-formed, we do not expect to receive a new hat. Certainly, the reformers and politicians of thirty years ago thought in terms of industrial practices that were rapidly becoming obsolete. The reformer is always an impractical idealist. He is never a realist where others are concerned.

One of the first essentials in the harmonious introduction of new ideas into industry is appreciation of the effect of these new ideas upon the great group of workers, foremen, and executives known as the human factor. As we look back upon the period of rapid mechanical evolution in industry, it is easy to understand the disturbances incident to the installation and operation of labor-saving equipment.

In the old days, when nearly all work was performed by hand, it was common practice to employ many men to do the work which later was to be performed by one man with labor-saving equipment. It was natural that some men should feel that unemployment must increase in proportion to the increased use of labor-saving devices. If the development of labor-saving equipment were dwelt upon without consideration of other factors entering into the situation, it is apparent that some workingmen might be apprehensive.

New Methods Always Questioned

Events are said to "cast their shadows before them," but it sometimes requires unusual eyesight to see them. Even today, with airplanes doing a regular sight-seeing business over the country, with the air mail extending daily, with air passenger service a reality throughout Europe, with Lindbergh as a living inspiration—there is slight appreciation of the air achievements of the future. If this is doubted, ask a banker's advice as to investment in airplane manufacturing stocks. The time will probably come when some of these stocks which may now be classed as speculative will be classed with the best of automobile stocks as investment opportunities.

Agriculture and Industry

Slosson, in speaking of gasoline in the book, *Science Remaking the World*, remarks of agricultural possibilities:

¹ "The transformation of the farm by motor fuel, striking as it seems, is only beginning. Agriculture has so far been comparatively little affected by the industrial revolution. This is because the revolutionary agent, the steam engine, has not found a place upon the farm as it has in the factory."

This latter conclusion is open to question. We have learned in industry the folly of blaming steam engines, presidential elections, or even Senate investigations for production difficulties. Thirty years of buffeting by reformers and by circumstances have taught surviving industrialists that they must look to themselves and their industrial associates for help and understanding. Henry Ford has a farm and farms it with machinery. And Henry Ford is not the only one who is farming almost exclusively with machinery. We expect Mr. Ford to use machinery on his farm. Some will even suspect that he does it with one eye on the market prospects. This should merely prove his adaptability and good sense. Furthermore, there is no better illustration of the usefulness of our present business system of production for profit. Ford and farmers who use machinery think in terms of machine

¹ *Science Remaking the World*, p. 40.

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production to the extent that they use it. Farmers who continue to struggle along under the old, back-breaking hand-work system of production simply think in terms of handwork. One evidence of this is the fact that farmers still employ "farm hands." Industry quit hiring hands when power production was recognized.

Furthermore, there are unmistakable signs that farmers are awakening to the possibilities of machine production. The farmers of America own several million motor driven appliances. These range from "mechanical milkmaids" to the fifty horse-power tractor and include the family car. The American farmer must learn the lesson learned by the American industrialist. Beware of the reformer. He will leave us with the same old hat. When farmers begin to depend upon themselves and work out their own salvation, farming will become a preferred vocation.

Thirty Years of Progress

The workers of thirty years ago could not foresee the enormous changes which would accompany the development of equipment and the improvement of operating methods. There were few at that time who would predict the eight-hour day. It was a common practice then to work daily ten and twelve hours and, in some instances, an even greater number of hours. In those days, the demand for products in a large measure was considered to be the requirements of a relatively small group of purchasers. Salesmanship, as we know it, was little understood. The average factory representative of thirty years ago was merely an order taker. Advertising was but slightly used to stimulate consumption and those in charge of production did very little to promote the interest of purchasers beyond periodical visits to inquire the condition of their stock. The salesman of two generations ago often assisted in "taking stock" and the making of an inventory was frequently coincident with the semi-annual visit of the salesman.

Salesmanship and Industrial Progress

Advertising and salesmanship have actually created markets where none existed before, with the result that not only have new business institutions entered the field but our very standards of living have been greatly promoted. Every line of business has been multiplied through the multiplication of interests in marketable goods. With this multiplication of business activities there has been increasing opportunity for employment. In former times, workers were limited in opportunity for employment to few industries and a few trades. In the industries where labor-saving machinery was effecting wonderful changes, there was observed a marked tendency toward specialization. Industries which formerly included a few trades were rapidly broken up into hundreds of specialized occupations which came finally to be recognized as trades.

Simplification and Human Service

Under the caption, "Can it be simplified?" Mr. Harvey Firestone, in his book, *Men and Rubber*, says that the Firestone Company began in 1912, building machinery to do the work formerly done by hand. His experience was similar to that of every industrialist who has gone from hand production to machine production. The old, hard handwork jobs that paid low wages because of uneconomical, low production vanished from the rubber tire industry wherever the machine was perfected. Mr. Firestone recalls that "manufacturers who had not gone to machine building advertised their tires as handmade." As Veblen points out in his *Theory of the Leisure Class*, the idea that handmade goods are better than machine-made goods is based entirely upon what he calls the law of conspicuous waste. Ruskin, great man that he was, yet made the mistake of devoting much of his energy to the "exaltation of the defective." . . . "John Ruskin and William Morris were eager spokesmen of this propaganda of crudity and wasted effort," according to Veblen. Morris, like our own Elbert Hubbard, specialized in making books. It is to be regretted that neither made automobile tires.

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The conspicuous consumer is willing to pay a high price for an imperfectly made book which he probably will never read, but he draws the line at buying an automobile tire which may blow out at an inconvenient time.

Later in his book, Mr. Firestone says under the caption, "The human relation":

¹ "We had only 12 employees in 1902. By 1904, we had an average of 35, and then, in the next year, we took a big jump to 130, but not until 1910 did we reach 1,000. Seven years later, we passed 10,000, and 1920 reached a peak of 19,800. That, it will be remembered, was the year in which one was fortunate if one got one half war production. In 1902, we did a business of \$150,000. In 1920, we did a business of \$115,000,000, but I can say with great earnestness that financing this tremendous growth was not nearly as difficult as solving the human equation, or, to be more accurate, getting something in the nature of a comprehension of the human equation. No one ever solves the labour problem."

Why Machine Production Was Opposed

None of these changes were foreseen by the average workman who saw only that his hand labor was being threatened by the development of equipment and "labor saving" methods. The result was a natural antagonism which had for its basis the most fundamental human instincts.

Veblen writing on the subject of "Industrial exemption and conservatism" in *The Theory of the Leisure Class*, says:

² "Any change in men's views as to what is good and right in human life makes its way but tardily at the best. Especially is this true of any change in the direction of what is called progress; that is to say, in the direction of divergence from the archaic position from the position which may be accounted the point of departure at any step in the social evolution of the community. Retrogression, reapproach to a standpoint to which the race has been long habituated in

¹ *Men and Rubber*, p. 136.

² *The Theory of the Leisure Class*, p. 196, published by The Viking Press.

the past, is easier. This is especially true in case the development away from this past standpoint has not been due chiefly to a substitution of an ethnic type whose temperament is alien to the earlier standpoint."

The student of industrial economics should understand also that the introduction of labor-saving equipment and improved methods of materials control was quickly followed by a general change in business procedure. New methods of financing operations led logically to more accurate methods of cost control in progressive industries and thus from one step to another the industrial system underwent a change so fundamental as to entitle it to be termed an era of evolution in industry.

Foundations for Industrial Unrest

In all these changes, during which the relatively few businesses survived whose leaders were able and willing to adapt themselves to the new order of things, there were few industrial leaders farsighted enough to take account of the effect of these changes upon the human factor. Generally speaking, these leaders were kept so busy adapting themselves and their businesses to the changing conditions that they found little time to devote to a search for other questions which seemed just then to be of less importance. The productivity of a new machine was evident; the relative productivity of the human factor under different conditions of factory organization was so intangible that its very existence was overlooked.

Businesses were conducted upon much smaller scales of operation in those days and in many cases the owner functioned also as manager. The daily association of owner and worker quite naturally produced a feeling of personal friendship. Those advantages we have always possessed are rarely analyzed; and so it came about that small scale industry did not understand the sources of this friendship between all who were associated in production. This understanding has been one of the results of the study of the problems in large scale production.



A cooperative industrial market at Johnson City, New York. Courtesy of Endicott-Johnson Corporation.

Friendship and Coöperation

Coöperation is the distinguishing characteristic of friendship. Friendship is never one-sided. Friends are always as useful to one another as it is in their power to be. Each thinks for the other and tries to put himself in the other's place. Naturally, when either one neglects to think for the other, friendship automatically ceases to function and the relationship becomes merely personal acquaintance. This acquaintance may be very close and yet not be a friendship. It again becomes friendship only when each party to the friendship takes equal interest in the other's happiness.

The highly intelligent owner-manager of former years was rich in friendships and his worker-friends rejoiced in their happy association. The owner who later was to be known as a capitalist knew many of his workers personally and counted many friends among his working force. This informal arrangement was usually satisfactory in results where a true feeling of friendship operated to prevent owners and managers from considering the human relationships in industry as such. Human relationships in industry did not differ from human relationships outside industry. If the business survived, there were jobs for as many of the workers as production would warrant. Naturally, his friends who worked for him did not question his fairness and the old-time owner-manager who had risen from the ranks had a way of dealing with all workers as if they were friends.

Present Methods Better for Men

There is a tendency upon the part of certain persons to lament the passing of what they call "the good old days" before mass production and specialization transformed industry. All we need do to convince ourselves of the unfairness of this judgment of old and new industry is to visit the average small shop and compare its sanitary arrangements and opportunities for human development and advancement with the sanitary conditions and human opportunities in the average large industrial plant. Men are men today even as

in other days and the average modern industrialist is quite as interested in securing coöperation as a result of mutual confidence as were the ethical owners of former times. The difficulty faced by modern large scale employers is not one of their own lack of good intentions nor of the lack of good intentions upon the part of workers—nor yet of material improvements. It is simply a problem of employers and employes getting close enough to become acquainted. We chose from a number of statements by modern leading industrialists the following by Mr. E. E. Yake, Assistant to the President, Worthington Pump and Machinery Corporation, in which he comments upon the need of modern industry for mutual interest in production:

“Coöperation between employer and employe is just as essential to the promotion of the interests of each as is the team work of a football eleven in gaining victory over a rival. In the first case, the two must work together to produce net operating profits so that the association may continue on a basis that is mutually satisfactory. In the second instance, the eleven men must play in full coöperation or more than likely go down to defeat.

Coöperation Must Be Mutual

“It has been said recently of the president of a large railroad that his generosity to his employes has been tempered only by his obligation to his shareholders. When in doubt, he has usually given the benefit to the employes, his conviction being that happy, well paid men make more money for the railroad. But the president referred to is not as sentimentally kind-hearted as is suggested. If he passed out favors to employes without consideration of the effect on earnings, the railroad would soon be losing money; and such a situation would benefit neither employer nor employe.

“The interests of the employer and employe are unalterably interdependent, the two win or lose together. Industries are coöperative enterprises and it is only when all sides are

considered and assured of fair treatment that progress is on a solid basis.

"The necessity today for close coöperation between employer and employe has become so obvious that it is axiomatic."

The Machine Age Is the Best Age

When we look back over the painful pathway of race progress and then looking about us discover undisputable evidence that much of the muck of past generations clings to our industrial system, we are apt to become somewhat pessimistic regarding our development. At such times, we should reflect that what seems rapid progress to one generation may seem slow to another. If we must go into the dark corners of industry, it is a relief at times to turn back into the light of present achievement and count our industrial blessings. In this connection, H. G. Wells offers evidence of trained observation. Coming from one who has long been a severe critic of modern industrialism, his comment is doubly interesting. In discussing "good will" in the book, *New Worlds for Old*, he says:

¹ "The world is now a better place for a common man than ever it was before; the spectacle wider and richer and deeper and more charged with hope and promise. Think of the universal things it is so easy to ignore; of the great and growing multitude, for example, of those who may travel freely about the world, who may read freely, think freely, speak freely! Think of the quite unprecedented numbers of well-ordered homes and cared-for, wholesome, questioning children! And it is not simply that we have this increasing sea of mediocre well-being in which the realities of the future are engendering, but in the matter of sheer achievement I believe in my own time. It has been the cry of the irresponsible man since criticism began, that his own generation produced nothing; it's a cry that I hate and deny. When the dross has been cleared away and comparison becomes possible, I am con-

¹ *New Worlds for Old*, Chapter I, published by The Macmillan Company, 1908.

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vinced it will be admitted that in the aggregate, in philosophy and significant literature, in architecture, painting, and scientific research, in engineering and industrial invention, in state-craft, humanity and valiant deeds, the last thirty years of man's endeavors will bear comparison with any other period of thirty years whatever in his history."



Plant Cafeteria.
Courtesy of Textile Machine Works, Reading, Pennsylvania.

INTEREST QUESTIONS

1. What are some advantages to owners and managers of businesses from being personally acquainted with all employees?
2. Are there any disadvantages in personal acquaintance between managers and employees? Explain.
3. What do we mean by mutual confidence?
4. List the national industries which were unknown thirty years ago. What trades do they include?
5. Name four industries which thirty years ago were operated on a small scale.

6. Name a number of pursuits now considered separate printing trades all of which were practiced by Benjamin Franklin as one trade.
7. Name three or more pursuits uncommon thirty years ago which are becoming common in large industries and are followed in many small factories.
8. Why do improved methods of manufacture improve working conditions?
9. Give an example of an improved method of manufacture.
10. Give an example of possible retrogression in industry as suggested by Veblen.
11. Why did the new methods of financing lead to more accurate methods of cost control?
12. Why does simplification in production improve standards of living?
13. Why is it uneconomical to form a habit of blaming conditions over which we have less direct control for handicapping progress?
14. Why does prejudice make friendship difficult?

READING REFERENCES

1. Barnes, Julius H. The Genius of American Business, "America's industrial progress," chapter XIII; "Need the farm feed the stomach alone?" chapter XIV.
2. Bloomfield, Daniel. Financial Incentives for Employees and Executives, vol. I, "Problem of incentives uppermost today," page 5.
3. Carver, Thomas Nixon. The Present Economic Revolution in the United States, "An American ideal," chapter two, part II.
4. Emerson, R. W. Essays, "Friendship," page 134.
5. Hughes, R. O. Economic Civics, "Modern business," chapter VIII.
6. Hurley, Edward N. Awakening of Business, "The price-fixing boggy and its substitute," chapter VI.
7. Johnson, Joseph French. We and Our Work, "Work, the creator of civilization," chapter I.

8. Lapp, John A. Economics and the Community, "Production," chapter III.
9. Lewisohn, Sam A. The New Leadership in Industry, "The education of the manager," chapter IV.
10. Shearman, Henry P. Practical Economics, "Man as a factor in production," chapter III.
11. Slosson, Edwin E. Sermons of a Chemist, "Looking backward—Living forward."
12. Watson, John B. Psychology from the Standpoint of a Behaviorist, "A general caution on efficiency methods," page 381.

CHAPTER XV

Economical Production as Related to Selling— Good Conduct and Economic Goods—Utility and Value

New Methods Must Be Sold

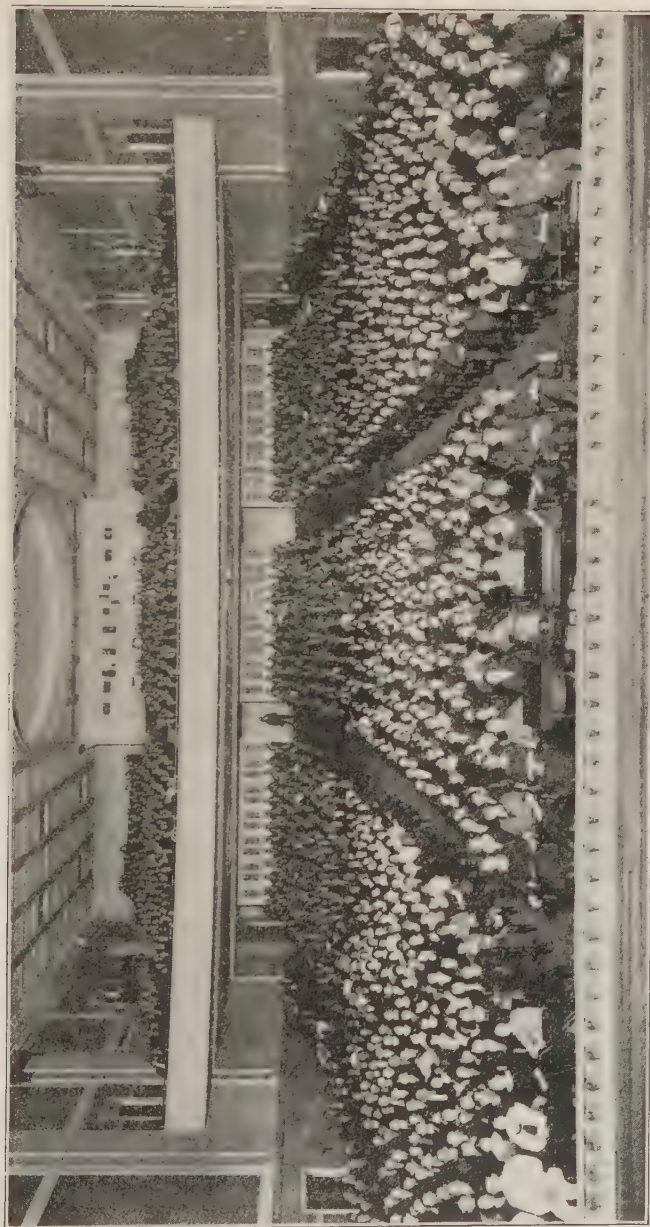
It is difficult to estimate how much modern civilization owes to the stimulation of interest in new and untried methods of production. History does not record one instance wherein mankind accepted at once any new idea. Human nature looks askance upon all innovations. As Munroe in Stewart Edward White's story, *Gold*, says:

"The human mind is certainly a queer piece of mechanism." We may rest assured that there were many martyrs to the use of fire before fire became commonly used. This is true also of the use of various foods, articles of clothing, and means of transportation and communication.

Of all new ideas, radio has met with less resistance from those who usually oppose innovations. This very acceptance is proof of the value of salesmanship and the passiveness of human wants. The general acceptance of radio was made possible because we had long become accustomed to the idea of wireless telegraphy and everyone was thoroughly sold on the telephone which was very like the radio receiving set in appearance and performance. If radio had preceded the telephone, it would have met with the same slow progress as did the telephone while a doubting public was being convinced.

Some things are so plentiful and easily available that there is no point in trying to sell them. Persons who live where water is sufficiently available to make its transportation and exchange unnecessary would smile at the idea of anyone erecting a reservoir in which to collect water to be sold to citizens of the community. There was a time when this

¹ *Gold*, p. 315, published by Doubleday, Doran and Company, 1924.



View of N. C. R. Co. plant auditorium. This auditorium is used as a social and cultural center for employees. Courtesy of The National Cash Register Company, Dayton, Ohio.

attitude would have applied to many of the things we have come to recognize as saleable.

Human Interest and Economic Values

At first glance, we are likely to think that the scarcity of a thing determines its relative value. This is not true. A painter might produce a picture which would interest no other person in the world, yet there might not be another like it to be seen; neither does it follow that the picture does not possess artistic qualities. A famous book was first printed at the expense of the author who published only a few for his close friends and was actually unable to find enough friends to receive as gifts the few he published. A hundred years later, the book was printed in many languages and publishers have made large profits from its sale.

It is evident that human interest is a very important factor in deciding saleability. It would be a mistake, however, to conclude that human interest is the deciding factor. Niagara Falls interested people long before Columbus discovered America. This interest grew with the number of persons who saw it. There are few who would say that the falls had no value during these years. Undoubtedly, there was an inspirational value in the thundering cataract for all who saw it. Anything which causes mankind to reflect is of value to the race in a popular sense. Sunsets, climate, atmosphere, and similar good things are valuable and are ordinarily free to all. Such value is not economic since we cannot exchange a sunset, a climate, or similar interests for other things. Exchange is the only basis of economic value. Although human beings are almost without exception interested in sunsets, climate, and atmosphere, this type of good thing is not ordinarily saleable.

Utility and Value

The student of industrial economics should note that in economics, as in any other specialized branch of human thought, special meaning is attached to certain words common-

ly used in a different sense. Although this should be a well-known fact, many mistakes are made because people in attempting to discuss a subject use words which have entirely different meanings.

Economists use the term "value" only when an article is desired so much that others are willing to offer something valuable in exchange for it. Value is the power which the good has over other goods in exchange and is the result of the marketing operations in modern economic society. The word "utility" is used to signify the quality of anything that satisfies a human want. In the economic sense, air always has utility but it has value only under those conditions which make it a marketable product. With these definitions in mind, we may return to a consideration of the changes in human affairs wherein utility becomes value.

People used to watch Niagara Falls and wonder what it would look like from the surface of the lower basin. This interest led to the construction of a boat which steamed close to the falls. This transportation represents a service which permits people to see the falls from a different point of view. People are willing to pay when they use the boat. In the case of climate, railroads and steamships have been built which, among other services, also help people to reach the climate they desire. In like manner, with the expenditure of money or other medium of exchange, one may view the sunset on the Pacific Ocean or in the Rocky Mountains and may breathe the rarefied air of New Mexico.

Management and Labor

It does not require any special management or labor upon the part of any other person for an individual to see a sunset if he happens to be where conditions are favorable. All one needs to do is to watch the sun go down in the West. It takes considerable management and labor to transport a citizen of Kansas to California to let him observe a sunset on the Pacific Ocean.

In the narrower sense, management is confined to those

who direct the efforts of others. One of the best of such definitions was recently given by Vice President T. G. Graham, B. F. Goodrich Company, who said that management is the "coördination of coöperation." But in a broad sense, "Management is the coördination of one detail with another and with the whole." In this sense, management is a most essential part of every economic activity. In accordance also with this understanding of management, each worker manages and it is economically important that this is understood by all industrialists.

If industry is to make the greatest possible use of every human factor and if industry is to encourage the maximum of creative thinking, we must encourage a broad understanding of management. It will be recalled that management and work are inseparable. All managers work and all workers must manage to some extent. The degree of management depends upon the amount and nature of details.

When air is plentiful, it is unnecessary to consider ways and means to maintain a supply. In deep mines, in submarine boats, and in balloons making altitude flights, the maintenance of adequate fresh air supply becomes a question of scientific management. It really should not be necessary to refer to management in this or any other case as scientific. The only reason for doing so is because so much that passes for management is in reality only a confused attempt to manage.

What Makes a Thing Valuable

There are three words which while not having exactly similar meanings, do have meanings sufficiently alike to remind well-informed persons of the others when one is used. These three words are science, management, and economics.

Science is an orderly arrangement of facts; management is an orderly arrangement of details—that is, the coördination of details one with the other and with the whole; and to practice economy is to arrange things in an orderly manner with due regard for all details. In other words, to be economic

is to manage. Thus, it is seen that when it becomes necessary to manage air, water, or other supplies, in order to produce material for exchange, then it may be said that an economic consideration has arisen. When it is unnecessary that some shall manage things in order that others may have an adequate supply, as in the case of a sparsely settled community having abundant water, the matter is not one for economic consideration. If management and labor by some are unnecessary to assure others of certain supplies, these supplies may be said to be free since no one can reasonably ask compensation for management and labor in connection with their use. On the other hand, a good is an economic good because people want it in exchange, that is, it has utility because there is not enough to satisfy all known wants for it. Or we may say in the economist's language, value has been added to utility. F. W. Taussig, writing on "Wealth and labor," in *Principles of Economics*, Vol. I, revised edition, says:

¹ "In a thinly settled community, where springs and streams are abundant, water is free to all. No question can arise as to its ownership or as to the mode in which the community should deal with it. Every one is fortunate in having an unlimited supply. No one can gain advantage by taking possession of part of it, or devoting labor to procuring it.

Free Goods and Economic Goods

"Water under such conditions is said to be a 'free' good, not an 'economic' good. It is not an economic good, in the sense that no economic problems arise regarding it. Every one has all he wants, and thereby is prospered; what more is there to say?

"A stage may come very early when some labor will be given to making the water conveniently available, and when it will be no longer strictly a free good; and when yet no economic questions of any complexity arise. The individual may dig a well, or pipe the water from a spring or stream to his dwelling.

¹ *Principles of Economics*, Vol. I, second edition revised, p. 3, published by The Macmillan Company, 1916.

The very first economic problem, that which may even be considered the fundamental problem, then emerges: How much effort is it worth while to give to the supply of this convenience?"

It is of interest to observe that economists connect the word "good" with the word economic. Things are referred to either as "free goods" or "economic goods" whether they are good for us or not. In the practice of economy, however, we must not neglect to observe the effect of products upon those who use them.

In other words, the practice of economy is not concerned with things which are questionable. It is concerned with saving things for people through management and labor. Saving energy, saving life, saving materials, saving equipment, saving time. This saving is the natural result of constructive thinking and relates to human life and human abilities as well as to materials and processes.

Economics and Economy

Such understanding of economy may be questioned at times. During a war, management is certainly required in the development of equipment and methods to be used to destroy all of the things economics is said to be concerned with saving. So does the butcher take the lives of cattle to produce food. Yet the history of the development of the meat packing business is one of progressive practices of economy.

Thus, it would appear that even destruction may be economically arranged. This apparent contradiction is explained by our earlier observation—that after all economic value is a matter of human understanding. What one may think has value in the economic sense is not certain to be accepted by all others as an economical arrangement.

When war is declared, it is assumed by those making the declaration that the end justifies the means. It is presumably assumed by both sides to the controversy that that which each is trying to conserve is more precious than that which

is being destroyed in the attempt to conserve it. The fact that each side to a destructive controversy is convinced of the other's injustice is usually accepted as evidence of a confused sense of economy. All normal persons agree that the "greatest good to the greatest number" is the chief concern in the practice of economy.

All Management Should Consider Human Needs

The difficulty faced by industrialists in deciding what is good for a majority of citizens is similar to the difficulties faced the world over. We have been so busy playing the game that we have not taken time to reflect upon the rules of the game. The rules have been there all of the time in our consciences. These can be summed up very well in one rule. As Dr. Dorsey says in his book, *Why We Behave Like Human Beings*:

¹ "In the whole history of human thought there has been voiced only one rule of conduct of the slightest value as a standard for human behavior. It is applicable to individuals, families, communities, cities, states and nations:

" 'As ye would that men should do to you, do ye also to them likewise.'

"But note that you and I as individuals can never get a start on putting the Golden Rule into practice until we have set our own house in order. When we strip our unethical and infantile hang-overs of behavior of their veneer of rationalization we are likely to be astounded, as Watson points out, at our 'susceptibility to flattery, weakness, inadequacy, or lack of knowledge, jealousy, fear of rivals, fear of being made the scapegoat,' and proneness to hurl criticism upon others to escape it ourselves. The first step in setting our house in order is to remove the beam from our own eyes—perhaps the hardest task man ever set himself, certainly a task that can be achieved only by the brave.

"When human society starts to practice the Golden Rule, it will lay a foundation for civilization which no flood of

¹ *Why We Behave Like Human Beings*, pp. 470-471.

passion can shake. Any other conditioning of our inherent nature leaves us as we are—with an animal nature modified only by man made devices to satisfy living impulses as old as life itself."

What Is Good?

What is good? This question has been the cause of sincere reflection by thoughtful persons throughout the ages. Occasionally some one will arise to announce his conclusion that after all "good" is a mere matter of individual definition. From such a premise, it is only a step to the conclusion that good is what each individual thinks is good. Such a conclusion is the foundation stone of anarchy.

Good is no more flexible than God. Certainly, our concept of God and good is always changing. The better informed we become the better is our conception. Good is always good, however, and there is only one kind of it; in fact, the very name of God means good. It is not the quality of good that has brought disorder to the world in this and former times. Rather, it is our lack of understanding. To be uncertain as to what is good in principle is to be unsafe. Inability to



Employees, Bethlehem Steel Plant. These men consider all manner of questions affecting personnel and production. This plant has never experienced a strike. Courtesy of Bethlehem Steel Company, Bethlehem, Pennsylvania

distinguish right from wrong, according to generally accepted standards, is generally accepted by courts as evidence of unsound mentality. "A double minded man is unstable in his ways." The person who sees the details without the principle, one fact apart from naturally related facts, is also unsafe.

There are some things that we know to be good and some things we know to be evil, as, for example, forgiveness is good, kindness is good, coöperation in good deeds is good. But it requires human understanding to choose the particular series of activities that applies these principles.

Persons who are afflicted with a chronic doubt as to good and evil are unstable in their ways. They are intoxicated with their own narrow understanding. Knowledge of the fundamentals of good and evil is the basis of all human development.

Man's Greatest Opportunity

In the final analysis, that which is constructive is good. Mankind's greatest opportunity is to define constructiveness in terms of production and distribution of the fundamentals of life.

That which is destructive is evil. On every hand, however, we are faced with the necessity of doing some tearing down in order that we may build up. If it were not for the "tearing down" process in the body, we would be utterly devoid of bodily heat. We place seeds in the ground that through their decomposition new life may be germinated. We sacrifice the lives of fish, fowl, and other animals that we may have food. We fell the trees that we may have lumber for our houses and buildings. We burn the coal that we may have heat and power.

How then shall we decide this important question upon which our understanding of good depends? The answer is constantly modified by our progress in the knowledge of good and evil. That action is good which is ultimately constructive. That action is best which is ultimately most constructive.

This leaves us with the decision to be made as to the relative constructiveness or destructiveness of various ideas and actions. And this is precisely where the practice of economy as distinguished from the science of economics comes to the assistance of speculation, for it helps us to decide each separate situation upon its own merits.

Naturally, we must proceed cautiously when defining constructiveness. This is where the practice of economy is of more immediate interest to the average industrialist than are the exact definitions of economic terms. This is true in the same sense that the practice of Christianity is of more immediate interest to the average layman than are the announcements of religious principles.

Practice vs. Theory

The practice of economy decides each particular situation upon the basis of its management in the interest of the human beings involved. Immediately, then, the question is changed from, "When shall we be constructive and when shall we destroy?" to "How much shall we use in order that we may have what we need and conserve our supply?" After all, good, like happiness, is a state of mind. If we attack every problem of life with the sincere desire to save while serving, we shall be in a good state of mind. When we think constructively, we shall act constructively whenever we are free to do so. Constructive thinking is the forerunner of constructive action.

It is interesting to recall that the salesman formerly sold "goods." There were dry goods, leather goods, and other kinds of "goods." Bills of lading commonly refer to "goods" regardless of their nature. In the spirit of economy, our understanding of good may be demonstrated in production and distribution. The practice of economy should result in good in the most constructive sense.

Not every industrialist needs to know the terminology of the science of economics. But every industrialist who intends to practice economy must decide what is good in the light of

the greatest good to the greatest number of persons. Industrialists as such cannot afford to be uncertain as to whether or not their service is good.

The Basis of the New Salesmanship

What a difference it would make in the manufacture of an automobile if we should recognize each part however small as a "good"! This bolt is a good. This chain, this casting—each one is a good. That is, it is good for human beings; and since management and labor are required in its development for sale, it is, therefore, an economic good.

That is the point where salesmanship in its true sense becomes a factor in industrial progress. It becomes the opportunity of the salesman to acquaint persons with the desirability and availability of these goods. The first duty in interesting customers is to produce goods economically. With this assured, salesmanship is relieved of all unstabilizing doubts. With a conviction of the economic use of the goods he is to sell, the salesman can approach his contact with confidence. Beyond this lies the field of human interest which the salesman must arouse. In his success rests the hope of continued economic coöperation. Thus, we see what a really important factor in industrial progress is constructive thinking. It is necessary to good conduct which in turn is the foundation of all human happiness.

INTEREST QUESTIONS

1. Name three "free goods" used in the average factory.
2. List three "economic goods" used in writing a letter.
3. What "good" which is sometimes free is made economic through the use of a furnace?
4. Is iron ever a "free good"? Explain.
5. Which requires more management—the making of a wire nail or the making of a telephone pole?
6. How may economical production aid in selling an article?

7. What is the relationship between sales and production?
8. What, if any, is the economic value in transatlantic airplane flights?
9. If a machine were built and never used in any way, would the fact that management is required in its construction indicate that its building was an economic enterprise? Explain.
10. If a foundry is producing castings for which there is a ready sale and ten per cent of its castings are imperfect, what is its percentage of "economic goods"?
11. Three workmen produce three articles. The work of the first is below standard; that of the second is of standard quality; and that of the third is of higher finish than required by prospective purchasers. Which is the best workman from the standpoint of human service, business stability, and economical workmanship?
12. Do standards of workmanship concern the amount of energy which should be used in production?
13. Should workmen be interested in varying success of salesmen who are selling the articles they are producing? Explain.
14. If the performance standard on a certain operation is ten minutes and the operator does the work in nine minutes, should the achievement be considered economical?

READING REFERENCES

1. Chapman, J. Crosby, and, Counts, George S. Principles of Education, "Problem 14—How may education order and humanize the economic life?" pages 234-263.
2. Emerson, Harrington. Efficiency, "The realization of standards in practice," chapter VI.
3. Firestone, Harvey S., and, Crowther, Samuel. Men and Rubber, "Wild rose lotion," chapter III; "Taking the bunk out of sales," chapter XII.
4. Robinson, James Harvey. The Mind in the Making, "The scientific revolution," chapter VI.

5. Shearman, Henry P. Practical Economics, "Origin and nature of value," chapter XI.
6. Taussig, F. W. Principles of Economics, vol. I, revised edition, "Of labor in production," pages 20-22 (paragraph 3).

CHAPTER XVI

Six Common Errors in Recording Costs—Stabilized Employment as a Result of Accurate Recording of Costs of Production

One of the most difficult problems arising in this era of big business is that of presenting facts and figures in such a manner that their magnitude and their significance may be comprehended. The magnitude may be roughly suggested by comparisons but their real meaning requires analysis. A toothpick manufacturer who desires to convey an accurate impression of the volume of product turned out by his plant in any one year goes about it by pointing out that "if all the toothpicks made during that period were stood on end, side by side, they would make a plank walk three inches thick and six feet wide extending from Cleveland to Detroit."

When it comes to visualizing the technique involved in the successful management of a large industrial organization, we comprehend it to about the same extent as we do the navigation of an ocean liner. When the sky is clear and the weather is calm, we are aware only of the constant throbbing of the engines as they speed us on our way. But when night sets in, and the liner plows on and on through the darkness and the fog, we begin to marvel at the science which makes it possible to guide this big ship safely through unseen dangers without the slightest deviation from its course. And we are apt to attribute this performance to the presence of an able captain who knows his job and to an efficient crew always ready and willing to carry out his instructions.

But if we ask the captain how he does it, he will show us a compass which indicates the direction he is going and a chart which indicates the course he must follow. He will tell us about the stars and how he uses them to determine the position of the ship from time to time. He will point out lighthouses marking the dangerous reefs and buoys which show the course

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of narrow channels. And last, but not least, he will tell us of a crew down in the engine room constantly on the alert for signals from the bridge upon whom he must depend for quick action in the emergency which arises when some unreported and unmarked obstruction suddenly looms out of the darkness dead ahead.

Cost Accounting Essential to Production

So it is with a great industrial ship. We, too, must have an able captain, and the crew which operates the plant must be ever ready to respond to the emergency. But if we are to steer a straight course through the unseen dangers of modern competition, we must have some means of guidance. We must have some method for determining our material and labor costs and for checking up from time to time our inventories, our markets, and our overhead expense. The moment we relax, we are in danger of having our competitor loom out of the darkness and ram us in the side. To keep out of the other fellow's way, we should always be one jump ahead of him, or at least be steering a parallel course. But before we can know the other fellow's position, we must know just where we stand ourselves.

Cost Records Should Be Understood

That understanding of cost distribution is not the special problem of less developed industries is evident to anyone familiar with operation of the American railways. Here is a business wherein record keeping is compulsory in conformance with state and federal laws. As has been pointed out by Mr. Howard Elliott, formerly Chief Executive Officer of the New York, New Haven and Hartford Railroad Company, in his book, *The Truth about the Railroads*:

¹ "There is plenty of information at hand about the railroad business. No form of business in the United States is conducted so openly, and in none are the facts and figures

¹ *The Truth about the Railroads*, pp. xiv, xv, published by the Houghton Mifflin Company, 1913.

so available. This information does not reach the everyday citizen, who is interested but lacks ready sources of information, to the degree that it should. . . .

“ . . . The railroad system of the United States is a great piece of commercial machinery, essential to every one in this complicated modern civilization; without this piece of machinery, there could not be the volume of business—agricultural, manufacturing, and commercial—that there now is. The magnitude of these transactions is so great that this piece of commercial machinery must be kept in the very best order, and its capacity must be increased all the time. Without this, much business could not exist; on the other hand, without the business, this piece of commercial machinery would be idle and rust. The relation between the two is very close.”

Although Mr. Elliott's book was published in 1913, these statements are as true today as when they were written. Not only are they true of the railroad situation, but they will apply with equal force to many other businesses. Continuing, Mr. Elliott says:

¹ “When a freight-car is standing still, it is doing no good to the railway or to the people, but the railways have had to pay for that car, and a part of their capital is invested in it. When it is standing still, it is not earning anything on that capital, and as the capital of the railways is a part of the national wealth, the usefulness of the national wealth is impaired by the loss incurred through the idleness of the car. When a freight-car is waiting to be loaded by a shipper, or when it is waiting to be unloaded by a consignee, that car is not in the service of the people, whose demand for transportation is now in excess of the capacity of the railways to supply.”

The empty box car should be singled out for special attention and this calls for special records and action.

Cost Reports Are Useless Unless Applied

In the operation of a progressive industry, the cost depart-

¹ The Truth about the Railroads, p. 78.

Six Common Errors in Recording Costs

ment renders vital service in helping to find the way. It serves as compass and chart and log. But cost reports are inanimate and cannot by themselves make improvements in manufacturing problems nor can they guarantee intelligent operation of the plant. Cost reports must be studied, and only as they serve as a guide to better management are they of value to the organization. The cost reports of present operations represent the gauges in the engine room of our industrial ship on which every deviation for normal operation is indicated. Those of past operations furnish data for the charts.

Time Cards a Basis for Cost Recording

With the exception of fixed charges and depreciation, practically every element of cost emanates from the time cards, material requisitions, and finished product delivery sheets. These records originate in the department offices under the supervision of the foremen. And it is obvious that the accuracy of the completed cost records will depend largely on the accuracy of the fundamental entries from which they are compiled. Incorrect charges of labor or shop orders or incorrect deliveries of finished products against which this labor is applied are bound to result in faulty costs which tend to lead us into dangerous waters. Likewise, incorrect charges of labor and supplies to the various expense account numbers render unreliable the gauges by which we measure our operating performance. An unreliable compass is worse than no compass at all. So, if we are going to use cost records as a guide to management, we must exert every effort to guarantee their accuracy.

Essentials Must Be Observed

Unfortunately, however, there is an impression sometimes prevalent among workmen and mechanics that record keeping is of minor importance when compared with production.

This impression is a direct result of ridiculous attempts upon the part of less experienced executives to reduce all operations to mechanical routine. Making a method "fool

proof" is about as possible as making a hotel fireproof. Mr. Firestone tells an amusing story of the over-organization of his factory in discussing, "Management and frills." He says:

¹"Gradually we got an organization—a real organization, second to none in its division of duties. It seems—now that it is all over—that we never faced a duty without dividing it."

A divided duty is like a divided house of which it was said: "And if a house be divided against itself, that house cannot stand." There are persons to be found in every group who are smitten with the theory of analysis. Somewhere they have heard of the value of analysis. Forthwith they begin to divide and subdivide. They card index and classify. Certain schools and colleges have featured analysis and have thereby added interest to the enterprise. There is nothing wrong with analysis. The great leaders in education from Herbert Spencer to John Dewey have always considered analysis and synthesis together. Analysis is the act of taking apart and synthesis is the act of putting together. Food is broken down during the digestive processes and synthesized—that is, built up again on its way to the cells of the body. If we stopped with digestion, we would shortly starve to death. That is what happens to any business whose leaders become so interested in analyzing and classifying duties that they forget the important duties of production and distribution. There is danger of analysis becoming a sort of game in which we gratify the instinct of curiosity. Mr. Firestone tells how department heads became so absorbed in records and reports that they "began writing letters to one another." They wrote so many interdepartmental communications that they frequently "got a day or two behind in reading them." In Mr. Firestone's opinion, there is "no better way of fooling one's self than by writing inter-office communications and asking for reports."

Testing Reports for Usefulness

When the business depression of 1920 hit the rubber tire industry, Mr. Firestone "cleaned house" as it is understood in

¹ Men and Rubber, p. 113.

industry. Every type of report was examined in view of its possible necessity. When they had finished reducing records and reports, it was found that the statistical department had been reduced more than ninety per cent. Furthermore, he asserts that the few statisticians could present the necessary facts much more simply "where before we got only reams of stuff we could not understand." Mr. Firestone adds that each report is tested upon the basis of its actual use. The economy of such measures is reflected in Mr. Firestone's statement that then they were able to reduce "the office force from 1000 to 300" and operate efficiently. Unquestionably, we should avoid waste which is sure to affect the selling price. Industrialists who live here and now can never forget that the vital principle of economics is value in exchange. If, through waste, the price becomes prohibitive there can be no hope of exchange; hence the economic value of the product or service is lost.

Being a slave to useless charts and records is being a slave to superstitions. Slosson mentions this difficulty in urging his readers to revise their ideas:

¹"All your reasoning, however correct, all your knowledge, however great, may be vitiated by some fundamental fallacy, carelessly adopted and uncritically retained."

Errors Breed Errors

Dr. Slosson's warning against superstitions is particularly applicable to industry. Nowhere can there be found more fanatical beliefs than in industry. Nowhere is this more evident than in connection with the keeping of records. To some, all records are useless; to others, the record is their fetish. There is a simple test we may apply: Does the record render the doing of the job easier or cheaper? Dr. Slosson warns us again that:

²"Errors breed errors. They multiply like microbes, especially through neglect. A single false belief may infect all the sound facts you pile in on top of it. Better an empty room than a rubbish-heap. In the words of our American philosopher,

¹ Chats on Science, p. 189; ² p. 190.

Josh Billings, 'it is better not to know so many things than to know so many things that are not so.'

¹" . . . Ideas are apt to sprout or spoil, like potatoes in a cellar. Facts will ferment from yeasty thoughts until they intoxicate the brain. Falsehoods generate ptomaines, poisoning the mind and producing inexplicable disease and death."

While Mr. Firestone's description of his own experience is timely, it will be observed that he does not consider doing away with all records and reports. It is clearly understood that some reports and records are essential and these should be accurate.

The only way to insure against costly errors is to know the facts and make use of them according to the requirements of each situation. There are a few errors common to industrial record keeping and these are costly. They are worthy of careful consideration.

Common Errors—Wrong Shop Orders

First: Quite frequently the time is charged to the wrong shop order. An extreme case of this kind is taken as an example: An operator failed to change his time when he finished the job and for an entire week his labor piled up against the cost of the wrong shop order. Had this record been used as it came to the cost department without further investigation, a selling price would have resulted that would have driven this particular product completely off the market and ultimately some one would have lost a job due to the curtailment of production. In this case, however, the discrepancy was so large that it was quite noticeable.

How often it happens that small amounts of time are charged to the wrong shop order and the error escapes notice, is a question of economic interest to all. Whenever this happens, it means that one of two evils is present: Either salesmen are handicapped with a selling price that is too high, thus making it extremely difficult for them to meet competition, or else money is actually being lost on the product when all concerned think they are making money.

¹ Chats on Science, p. 191.

Six Common Errors in Recording Costs

Transposed Digits on Shop Orders

Second: Sometimes the digits of the shop order number are correct but have simply been transposed. And right here we might ask ourselves if any of us ever had any particular success in getting the correct person on the telephone by transposing the digits when calling the number? The tabulating machine has absolutely no way of knowing that the operator meant to write 12 hours on a time card and transposed the digits to make them read 21.

If the error is big enough to attract attention, the cost department will spend much valuable time trying to study out, with the aid of the foreman and his timekeeper, just what happened. Some of these transpositions result in such complications that it takes only three or four of them to make a day's work for one member of the cost department.

Omitted Drawing Notations

Third: Drawing notations used to distinguish parts are frequently omitted. Usually there are several figures or groups on the same drawing which, for the sake of illustration, may be compared to the houses on a city street. We may know the name of the street we want, but if we don't know the number of the house, it takes much inquiry and time to find it. Similarly, when several different parts are made on the same shop order and the drawings for each of these parts cover several figures or groups, the computation of an accurate cost from a cost collection sheet showing only the drawing numbers with figure and group numbers omitted is sure to involve considerable inquiry and wasted time.

Shop Orders and Standing Orders

Fourth: Often time is charged to shop orders instead of to standing orders and vice versa. The first of these errors is very easy to catch, for when the cost department begins to post the time on the cost collection sheet of the shop order, the standing order number appearing thereon tells him right away where the charge should appear.

In the opposite case, however, when time that should have been charged to a shop order is charged to a standing order, the effect is far-reaching. The cards on which these standing orders are entered are, for economy's sake, sorted and added periodically and less frequently than those of shop orders. Any time erroneously included on standing order cards virtually remains on a side-track for a period of time before it is finally uncovered and brought to light.

In adding up the hours and amounts to be entered on the standing order accounts, the various parts are usually separated by number primarily for the benefit of the rate department. This separation, however, gives the cost department an excellent opportunity to check up on the parts which have been included in each individual standing order account. If shop orders have been thus confused with standing orders, there will be a list of parts left over after checking against standing order accounts the cost of which should have been collected directly on shop orders. When an attempt is made to transfer this time back to the proper cost collection sheets, it is sometimes found that several orders have been issued for this particular product; and it is extremely difficult to know to which one such time should be charged.

Also, such shop orders are usually closed up before the standing orders are tabulated. In many instances, costs based on cost collection sheets on which a large part of the true time has been omitted have already been sent through to the sales department and erroneous lower selling prices have been established before the omission has been discovered.

You can readily picture the reaction which must result throughout the entire organization when the cost department reports lower costs than are justified, and lower selling prices are made based on shop orders which appear to be accurate, and then, after the standing order is compiled, it is discovered that a lot of the time which should have appeared on those shop orders has been side-tracked.

Obsolete Standing Orders

Fifth: This same list of left-over items appearing on the standing order tabulation sheets usually reveals numerous items that are charged to standing orders that do not exist. By means of the identifying part numbers, the standing order clerk is able to transfer a part of these charges to the proper accounts. The remainder of it, however, is chargeable to shop orders, and in many cases it is lost for the reasons described in the preceding paragraph.

Incorrect Weight or Form

Sixth: Deliveries of finished product to stock and the weights thereof are frequently incorrectly reported or reported in the wrong form. Failure to account for the entire quantity received on any order, either through entries in the scrap account or in the record of the deliveries of finished goods to stock, means the loss of clerical time in the cost department in making sure that the total labor cost is being pro-rated over the correct quantity of product.

Sometimes, too, when a shop order calls for a certain definite quantity of any one kind of product, a larger quantity than is specified is run through on that order. Unless the deliveries to stock show this excess production, an inflated cost results which ultimately gets back to the salesmen in the form of an increased selling price.

Another source of incorrect costs closely related to the above lies in the careless recording of weights. Recently a case of this kind occurred in a large foundry. A weight of 235.5 pounds per 100 castings was entered on the face of the shop order as 2355 pounds. In this instance, the cost department of the foundry overlooked the error and the material was charged in on the basis of over one ton per 100 castings. It happened to be a charge against a very progressive organization, however, and the efficiency of their record keeping is such that the error was discovered immediately and sent back for correction. Of course, the explanation forthcoming was that the decimal point was off "only" one place.

Cost Recording and New Estimates

In the discussion of these sources of error in the making of records, comment has been made briefly upon several places where waste may result. Clerical effort is expended in cost departments on the investigation and correction of the records, but there is another element involved which is of far greater importance and which is of vital interest to anyone who is interested in industrial economics.

No matter how busy industrialists may be with present industrial problems, the day is about to come when estimates will be made on new work. If, in the rush, records have been slighted, one or more of the foregoing errors may have crept in with the result that the cost returns are inflated or deflated. Investigation on the part of a cost department may fail to reveal any outstanding discrepancies, so the cost record is closed up and regarded as final. In the meantime, the sales department comes along and wants an estimate on a similar job. The estimators may think they know what it costs to perform the first job and the new estimate is figured accordingly. A selling price is determined and the sales department goes about its business of convincing the customer of the reasonableness of its prices. If the cost is too high, the competitor comes along with a cost that is not inflated and he underbids by a considerable amount. He gets the order and production within the first mentioned plant slackens. And the industry whose workers and foremen are less concerned about the accuracy of records when production is booming finds itself laying off men for want of work—and doesn't know why. If the cost has been misjudged and too low a price is established, the salesmen may get an abundance of orders each of which may be helping to send the company farther into financial difficulty.

INTEREST QUESTIONS

1. What is the relation between cost records and cost control?
2. What is meant by the "compass" of a factory organization?

Six Common Errors in Recording Costs

3. Why are inventories important and what may they include?
4. How may excessive labor costs result in prohibitive selling prices?
5. How may inexperienced labor increase overhead? materials cost?
6. How may a cost department "point the way" toward safe business methods?
7. How may errors in making out time cards interfere with sales?
8. Why is it important to record labor and supplies correctly?
9. Why is it as important to record time and material correctly as it is to observe standards of quality and quantity performance?
10. What effect would charging time to a wrong shop order have upon selling the following products: (a) The product against which the time should have been charged and (b) the product against which the time was wrongly charged?
11. To what extent may ability to read blue prints affect cost control?
12. Why may accuracy in common and decimal fractions influence selling through cost records?
13. What is meant by a "standing order"? "shop order"?
14. To what extent does the sales department depend upon accuracy in making out time cards?
15. Why is a time clock used in many places for recording time on jobs?
16. Which of two competing firms is likely to furnish more permanent employment—one where the management allows every one to use his own judgment in keeping time records or one whose management insists upon careful observance of definite rules regarding time records?
17. What is the relationship between estimates on new contracts and former time and materials records?

18. How may inflated costs interfering with sales result in a lay-off?

READING REFERENCES

1. Burch, Henry Reed, and, Patterson, S. Howard. Problems of American Democracy, "Unemployment," pages 402-406.
2. Carver, Thomas Nixon. The Present Economic Revolution in the United States, "The genesis of a labor problem," chapter three.
3. Everitt, Frank and Heywood, Johnson. Cost Control for Foundries, "Normal and abnormal costs," chapter XIII.
4. Johnson, Joseph French. We and Our Work, "Competitive prices," pages 180-181.
5. Lapp, John A. Economics and the Community, "Buying and selling goods," pages 55-56.
6. Lindbergh, Charles A. We—President Coolidge's address of welcome, pages 272-279.
7. Shearman, Henry P. Practical Economics, "Influence of cost and utility on price," chapter XVII.
8. Taussig, F. W. Principles of Economics, vol. II, revised edition, "Business profits," chapters 49-50.

CHAPTER XVII

Cost Control and Economic Progress

Before competition was keen, many industries had just one overhead account which they pro-rated over the entire product on a percentage basis. It is obvious that such a practice resulted in misleading costs, some of which were far too high and others were far too low.

If a company is to compete successfully, it must apply to the cost of each and every product only the overhead expense which rightfully belongs to it. If we are to go one step further and make an effort to reduce this overhead expense, we must analyze it in order to know what is in it. The expense is, therefore, collected within each cost center. Failure to charge the proper expense account destroys the effectiveness of this analysis and renders it correspondingly more difficult to maintain intelligent control over operating expenses.

So it is that faulty records, like a faulty compass, are worse than no records at all. For whenever a record is consulted, it is usually for the purpose of guiding action along the direction indicated.

But no compass has ever yet been devised that actually steers the ship and there is nothing to hinder the navigator from heading in the wrong direction if he fails to observe the position of the needle or neglects to study his chart. Similarly, the most accurate cost reports will serve no purpose if interested persons do not heed them. In these cost records, overhead must be carefully analyzed.

Expense Accounts and Overhead

By means of the expense account kept for each cost center, an industrialist can tell exactly what supplies are costing him and what these supplies are. Weekly "waste committee" reports afford an excellent opportunity to control the cost of the indirect and expense labor.



Foremen's Training School at The Lorain Steel Company's plant, Johnstown, Pennsylvania. Foreman training has come to have great significance. Courtesy of The Lorain Steel Company.

In connection with this overhead expense, it is important to watch depreciation charges. To do this, one must be familiar with the records of the machinery, furniture and fixtures, and durable tools that are charged against each department. The payment for a piece of machinery through an annual depreciation charge over a period of years is just as much of an expense item as though it were included in the regular expense accounts.

Quite often machinery and durable tools are transferred from one department to another and no effort is made to correct the files. So the depreciation charge against the department in which the equipment was originally located goes on month after month, inflating not only the overhead rate of this department but also the cost of the products against which this overhead rate is applied. In one plant, one-third of the personnel of the cost and rate department was at one time employed on the investigation of faulty costs. It is apparent that united action on the part of all interested persons would ultimately result in saving through the elimination of inaccurate records, meanwhile some products are being made at a loss due to failure to assess proper depreciation against them. The experience of a large foundry illustrates the possibilities of accurate placement of costs:

Fairer Prices through Cost Accounting

A new manager was placed in a plant that was losing money. Previous to his coming, all costs had been averaged. The plant was making small castings and also a number of large castings for the molding of which the foundry furnished patterns. No attempt had been made to determine the exact share of overhead and depreciation which belonged to different jobs.

This new manager realized that the operation of cranes and other equipment increased the cost of making the large castings and that the crane charges should not be assessed against the small castings. A new allocation of costs was

made which showed that the large castings in reality were being made at a loss.

A new price was made on these large jobs to cover the cost of production and a reasonable profit. The customer was informed that the company would be glad to continue the manufacture at this increased price. At the same time, the manager carefully explained the reason for the change in price, assuring him that the quality he desired would continue to be observed. The customer considered taking the work to another foundry and the manager generously offered to loan the customer the patterns for the castings. The patterns were borrowed and the order placed with another foundry.

The customer tried out several foundries which did inferior work at lower prices and finally convinced himself of the fairness of the attitude and prices of the new manager. He then made out a new contract at the prices which had been determined by a fair division of the overhead and depreciation.

Accidents and Costs of Production

Accident prevention, too, is another means of reducing overhead expense. An effective program along this line will lower the cost of insurance premiums paid for industrial compensation as well as the amount of the payments made to injured employees for lost time.

There is another angle to accident prevention which is often lost sight of. Industrialists are likely to overlook the fact that accidents are in themselves evidences of inefficiency in operation. Sidney J. Williams, writing on "Industrial accidents" in the book, *Waste in Industry*, says:

¹ "A piece of material falls off the truck and injures the workman's foot. We call this an accident and we know that it results in an economic loss. But there are many other times—perhaps a hundred or more—when a piece falls off the truck but does not happen to fall on the workman's foot. . . . From the economic standpoint, the injury is chiefly important

¹ *Waste in Industry*, pp. 335-336.

not because of its own direct cost but because it attracts attention to a condition of inefficiency which in the aggregate is even more costly.

“ . . . What is an accident? One dictionary definition is ‘anything occurring unexpectedly.’ In this broad sense, the material sticking in the punch press, the belt breaking, the casting falling off the truck, the railroad train jumping the track, is an accident, whether any person happens to be injured or not. Against this idea, place the idea which is the spirit and aim of all large scale production—to determine the ‘one best way’ of doing things, and always to do each thing in that one way. Obviously, these two ideas are in direct opposition. All accidents in the broad sense—all things occurring unexpectedly—are hindrances to efficiency, whether any one happens to be injured or not. The occasional accident in which some one is injured therefore has a significance beyond its own cost—it serves as a symptom of many other ‘accidents’ in which no one was injured but through which time was lost and production curtailed.

“If accidents hinder efficiency, it is equally true that efficiency hinders accidents. In a perfectly efficient plant, nothing would ever happen unexpectedly and there could be no accidental injuries. . . . As long as executives and engineers, like other men, are imperfect, any new impetus to higher production efficiency—any new assistance in securing the higher efficiency—is a good thing. Therefore accident prevention work is economically desirable as an aid to efficiency as well as for its direct saving of money. . . .

“It is impossible to make even an approximate estimate of the amount of money which has been saved or may be saved by increasing production through accident prevention work. In the specific instances noted, punch press production was increased 10 to 100%. In general, the limit of this saving is nothing less than the total saving which might be made through the elimination of all stoppages or interruptions in production. Whatever this possible saving may be—and

we know that it is tremendous—organized accident prevention work will be of material assistance in bringing it about.”

Another item in overhead is rent. Rent usually includes light and heat, janitor service, and maintenance of buildings and structures. The conservation of heat in the winter time and the careful use of lights will undoubtedly make an impression on these figures. Even janitor expense is cut down when everyone is careful not to make dirt for the other fellow to clean up. An incident of this kind is referred to in the plant whose personnel and production policies are described in the chapter on “Making men while making money.”

Other Items of Overhead

Power costs are another item of overhead expense. It is obvious that motors should be shut down and steam turned off when not in use. And by all means, the use of compressed air for any purpose other than that for which it is intended should be discouraged.

Gains and losses through labor costs represent the net effect of a combination of influences which tend to promote or hinder, in more or less degree, the efficiency of labor application.



Main Building of General Motors Institute of Technology, Flint, Michigan. Great corporations are spending millions of dollars on the technical education of personnel. Courtesy of General Motors Institute of Technology.

It is evident that the greater the number of men employed on any single operation, the more that operation will cost. On the other hand, if a plant or a department does not have enough reserve labor to perform all the work that there is to be done or to cover the jobs of absentees, costly delays will result. A careful balance must be maintained at all times, therefore, with reference to personnel.

When progressive operations are to be performed on large quantities of any one kind of product, it is usually considered to be cheaper to employ as many men on the job as there are operations to be performed. This saves the time required by one man in passing from one operation to another and minimizes the inertia of getting started on each operation. It also saves the floor space required within the department for storage of work in process and thereby eliminates congestion which is the source of costly delays. And because of the relatively shorter time required to complete the job, it cuts down the cost of interest charges on the investment in the work-in-process inventory and renders more efficient service to the customer.

It is economical to utilize all of the mechanical equipment which may be effectively operated. If work is done by hand when machinery is available and will do the work, costs are pretty sure to rise. Economic progress depends upon the coördination of all economic factors. This coördination is best achieved through cost control.

INTEREST QUESTIONS

1. Why does competition bring about changes in industrial bookkeeping?
2. What is meant by a cost center?
3. What might be some details of a waste committee's report?
4. What is meant by depreciation?
5. Are depreciation charges intended to indicate a transformation of capital from one form to another or a real loss? (See Shearman's Practical Economics, page

- 70). When does a firm have a real loss from the depreciation of equipment?
6. How does the income tax system recognize that the same object may be used as capital goods and consumption goods? Give an example of how such a case is treated.
 7. Should depreciation be considered in the case of practically new equipment which has been operated less than one week? Explain.
 8. If a machine is moved from Department No. 1 to Department No. 2 on the third day of the month, when should the depreciation charge be transferred to the latter department?
 9. If Department No. 1 is charged with equipment used by Department No. 2, what effect may such transaction have upon the selling prices of products of Department No. 1? No. 2?
 10. How may clerical expense be increased through incorrect entries on time cards?
 11. How may accident prevention aid in selling the products of a factory?
 12. Why may a disorderly workman interfere with the sales of an article?
 13. All other things being equal, which of the following factories will offer best assurance of permanent employment: (a) One where all motors are shut off when not in use, (b) another where motors are frequently allowed to run idly? Why?
 14. Does the current used to light a small incandescent light enter into the selling price of the average article of commerce?
 15. If 25% of a working force were absent all of the time due to different ones "laying off," what would be the probable effect upon the selling price of the product of the factory, provided that absentees received no wages while "laying off"?
 16. If a piece of equipment is idle 5% of the time, what will be the probable effect upon the price of its product?

17. Name several ways in which a worker may coöperate in production to assist sales.
18. Why is an accident evidence of inefficiency in production or distribution?
19. What is meant by overhead expense?

READING REFERENCES

1. Carver, Thomas Nixon. *The Present Economic Revolution in the United States*, "Some consequences of a balanced economic system," chapter nine.
2. Emerson, Harrington. *Efficiency*, "The location and elimination of wastes," chapter VIII.
3. Hughes, R. O. *Economic Civics*, "Efficiency in conducting business," article 66, pages 135-139.
4. Hurley, Edward N. *Awakening of Business*, "Back to first principles," chapter I.
5. Johnson, Joseph French. *We and Our Work*, "How profits are figured," chapter XVI.
6. Lapp, John A. *Economics and the Community*, "Purchasing systems" and "Competitive bidding," pages 64-66.
7. Moxey, Edward P., Jr. *Principles of Factory Cost Keeping*, Introduction to principles of factory cost keeping, chapter I.
8. Shearman, Henry P. *Practical Economics*, page 70; "A simple analysis of manufacturing cost," pages 174-177; "The influence of sellers on prices," page 199.
9. Snow, A. J. *Psychology in Business Relations*, "The causes of price," pages 72-75.
10. Taussig, F. W. *Principles of Economics*, vol. I, revised edition, "Value and varying costs, diminishing returns," chapter 13.

CHAPTER XVIII

Moral Values in Machine Production

The Romance of Machine Production

There is as much moral argument in favor of machine production as there is in favor of accident prevention, medical service, and other devices for increasing industrial efficiency through attention to the human factor.

Accident prevention, which is certainly humanely desirable, is also industrially profitable. Medical service pays both industrial and human dividends. Likewise, machine production, which has long since justified itself from a business point of view, has its human justification in having released a multitude from physical bondage and multiplied production per man power engaged. Its human service has only begun. The romance of machinery will be one of the most absorbingly interesting chapters in our future history. Too often we fail to appreciate this fact. Sherwood Anderson, in his thought-provoking story, *Poor White*, treats of this phase of industrial progress in the following recital:

¹ "Ezra the cabbage farmer had come west from one of the New England states and had grown comfortably wealthy, but he would not employ extra labor for the plant setting and the work was done by his sons and daughters. . . . During the time of the cabbage setting he drove his sons and daughters like slaves. . . .

"In the spring of his second year in Bidwell, Hugh went often in the evening to watch the plant setters at work in the moonlight on the French farm. He did not make his presence known but hid himself in a fence corner behind bushes and watched the workers. As he saw the stooped misshapen figures crawling slowly along and heard the words of the old man driving them like cattle, his heart was deeply

¹ *Poor White*, pp. 78-81, published by the Viking Press.

touched and he wanted to protest. In the dim light the slowly moving figures of women appeared, and after them came the crouched, crawling men. They came down the long row toward him, wriggling into his line of sight like grotesquely misshapen animals driven by some god of the night to the performance of a terrible task. An arm went up. It came down again swiftly. The three-cornered hoe sank into the ground. The slow rhythm of the crawler was broken. He reached with his disengaged hand for the plant that lay on the ground before him and lowered it into the hole the hoe had made. With his fingers he packed the earth about the roots of the plant and then again began the slow crawl forward. There were four of the French boys and the two older ones worked in silence. The younger boys complained. The three girls and their mother, who were attending to the plant dropping, came to the end of the row and turning, went away into the darkness. 'I'm going to quit this slavery,' one of the younger boys said. 'I'll get a job over in town. I hope it's true what they say, that factories are coming.' . . .

"For a moment as he listened to the voices of the complaining workers, Hugh wanted to go to them and ask them to let him share in their labor. Then another thought came. . . .

"Hugh became absorbed in the notion of inventing a machine that would do the work he had seen the men doing in the field. All day he thought about it. The notion once fixed in his mind gave him something tangible to work upon."

Machines Born of Human Interest

After much experimentation by Hugh, the author relates that:

¹ "When the model of the machine appeared in the jeweler's window, a fever of excitement took hold of the minds of the people. Every one declared himself either for or against it. Something like a revolution took place. Parties were formed. Men who had no interest in the success of the invention, and in the nature of things could not have, were ready to fight

¹ Poor White, pp. 116-117.

any one who dared to doubt its success. Among the farmers who drove into town to see the new wonder were many who said the machine would not, could not, work. . . . 'Huh,' they exclaimed, 'a thing of wheels and cogs, eh? Well, so young Hunter expects that thing to take the place of a man. He's a fool. I always said that boy was a fool.' "

Thus begins the story of a series of inventions of labor-saving devices which had their origin in the sympathetic fancy of an inquiring mind. Such is the history of much of the mechanical progress of industry.

The Use of Machines Requires Judgment

Like everything else, there is a limit to the economical operation of machines, but these limitations do not in any way disprove the tendency of the times nor the value of the principle involved. In every shop, there are times when it is less expensive to do certain work by hand than to perform the operations necessary to do it with machines. Short runs requiring expensive set-ups on certain machines are sometimes more expensive than the small amount of handwork to be performed. On the whole, however, the machine is more economical. These production details of long and short runs are discussed here as examples of production where success depends upon accurate information which in turn is possible only where records have been kept.

The instruction of workers in regard to the performance of operations is prior to record keeping as the lack of it is sure to result in increased costs either through loss of work improperly performed or through serious damage to the equipment.

Costs Must Be Considered in All Things

So it is that some element of cost is involved in almost every move the industrialist makes. Considering the fact that all persons employed in industry are influenced by the results of control, it is obvious that interest in this kind of control should extend to the farthest corners of every plant.



1000 apprentices at Milwaukee Metal Trades banquet.

The amount of effort required to bring together from all departments the vast number of facts and figures which go to make up the costs of the various operations and processes performed therein, to sort them out and classify them, and to present them in such form that they may be readily interpreted, is one of the things in modern industry that is difficult to comprehend. But when we realize that this huge mass of statistics is built up piece by piece from information emanating from the departmental offices and that the completed cost reports serve as the only dependable guide in fixing prices, it is clearly evident that responsibility for cost control is an essential factor in modern business. The effectiveness of this control depends to a large extent upon the coöperative effort of all concerned. Coöperative effort is a direct result of planning. Coöperation is effective to the extent of the effectiveness of our plan.

INTEREST QUESTIONS

1. How may moral values in machine production affect the prices of commodities?
2. How may an industry or factory be judged with reference to its moral influence upon a nation or a community?
3. Is it possible for a factory to be neutral with reference to its moral influence upon a community? Explain.
4. Why must cost of production be considered in relationship to the use of machinery? How does this account for much present-day hand labor?
5. Why does the increased use of duplicating machinery emphasize the need for accurate cost accounting?
6. How may accurate cost accounting lead to the invention of labor-saving devices?
7. How should one proceed to decide whether a job should be done by hand or by machine?
8. Should machine production be encouraged as a means to increasing the happiness of all the people? Under what circumstances, if any, should it be discouraged?

Moral Values in Machine Production

9. How may we account for the fact that handwork prevails very generally on American farms when some farms are operated largely by machinery? How may improved methods of cost control affect this situation?
10. If an increasing number of American homes installed labor-saving devices and farmers increased their use of farm machinery, what would be the effect upon American industry and business?
11. Which is the more important to American industry: Foreign or domestic trade? Why?
12. How may increased use of machinery stabilize employment?

READING REFERENCES

1. Barnes, Julius H. *The Genius of American Business*, "The individual and fair play," chapter III.
2. Dewey, John. *Human Nature and Conduct*, "Introduction," pages 1-13; "Conclusion," pages 278-281.
3. Dewey, John. *Moral Principles in Education*, "The moral purpose of the school" (A definition of morals), chapter I.
4. Lapp, John A. *Economics and the Community*, "Agricultural problems," chapter XVI.
5. Lincoln, Edmond E. *Steps in Industry*, "The division of labor," chapter V; "Making goods more plentiful," chapter VI; "Large producers and small producers," chapter VII.
6. Litchfield, Paul W. *The Industrial Republic*, "The labor-capital opposition—Genesis and growth," chapter II.
7. Selekman, Ben M. *Employees' Representation in Steel Works*, "Steel making and human relations," chapter II.
8. Shearman, Henry P. *Practical Economics*, "The forces behind supply; cost of production," chapter XV.
9. Wiggam, Albert E. *The New Decalogue of Science*, "The duty of humanizing industry," pages 153-170.

CHAPTER XIX

Industrial and Human Progress through Planning Work

Most words have sprung from other words of somewhat similar meaning. In this respect, words are like human beings in that they bear some resemblance to the ones from which they descend.

The word "plan" is from the Latin word *planus* which means flat or level. To plan means literally to lay the details out in such manner that they may all be seen from any angle. The word "plain" comes from the same parent word and helps us to understand the nature of a plan. The word "plane" has a similar origin. When a machinist operates a planer, he is reducing the metal to a flat surface. If we stand in the midst of a plain, we can see objects at great distances. Persons who stand at the bottom of the Grand Canyon see only the gray walls and a patch of sky above them.

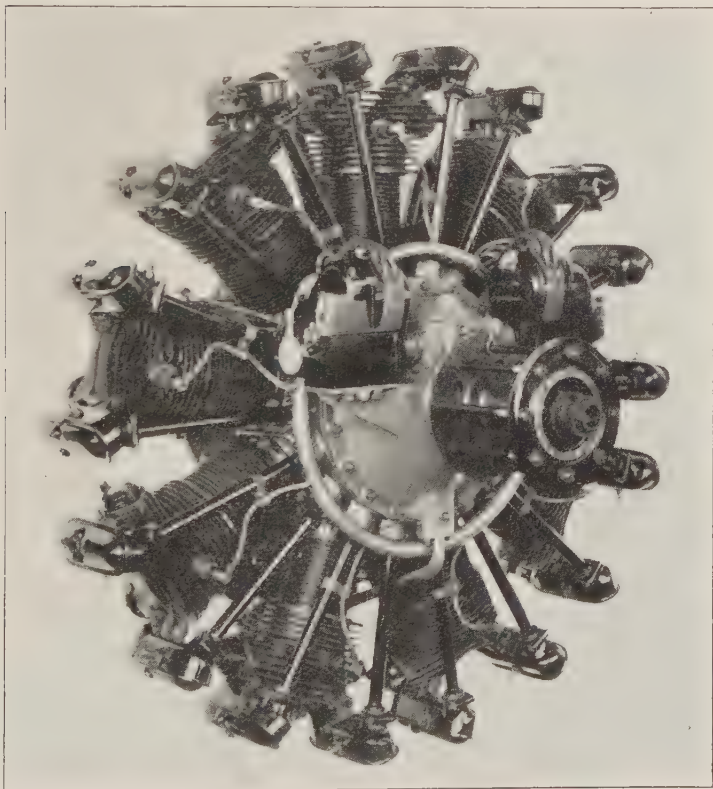
All plans, whether a book of blue prints for a million-dollar structure or the details of a day's work, should aim to accomplish the same result. The aim of a plan should be to reveal quickly and accurately important details.

Everyone knows that in order to arrive at any point, we must start from where we are. This is a fundamental of planning; yet it is frequently ignored. We often see plans made with great labor fall like a suspension bridge because their connections with present work are weak. The strengthening of these connections will be referred to later.

A Well Planned Job

One of the best examples of the extent to which careful planning contributed to the success of an undertaking is seen in a statement by Colonel Lindbergh in the story of the building of the Spirit of St. Louis:

¹ "The personnel of the Ryan Airlines at once caught the spirit of the undertaking, and during the two months of construction the organization labored as it never had before. Day and night, seven days a week, the structure grew from a few lengths of steel tubing to one of the most efficient planes that has ever taken the air. During this time it was not unusual for the men to work twenty-four hours without rest,



Wright "Whirlwind" 200 h. p. air-cooled aviation engine. This complex machine made Lindbergh's flight possible.
Courtesy of Wright Aeronautical Corporation, Paterson, N. J.

¹ From "We", by Charles A. Lindbergh. Copyright 1927. Used by permission of the publishers, G. P. Putnam's Sons.

and on one occasion Donald Hall, the Chief Engineer, was over his drafting table for thirty-six hours.

"I spent the greater part of the construction period working out the details of navigation and plotting the course, with its headings and variations, on the maps and charts. After working out the track on the gnomonic and Mercators charts, I checked over the entire distance from New York to Paris with the nautical tables."

The plan should begin where the work begins. The wise mechanic or foreman or higher executive, in so far as possible, plans his work in advance. He knows what is to be done, when it is to be finished, and how it is to be finished. The fact that he has to change the direction and extent of his plan never results in his being at any instant without a plan leading on from the spot where he is.

A Test of Intelligence

Man is distinguished from all other animals because of his greater ability to reason and reflect. Our ability to plan any activity depends upon our stock of memories and our ability to reason with this equipment. One test of intelligence is the clearness and completeness of our plans.

Only intelligent beings can make decisions. Planning is necessary in the making of decisions. In fact, all intelligent human beings plan everything they do in which decisions are necessary. Otherwise one would never get to work on time or carry any activity to a successful conclusion. Whether we plan on paper or merely "think the thing through," the fact remains that intelligent persons plan debatable activity. The more highly intelligent plan best, and the less intelligent plan less accurately.

When To Begin Planning

Intelligence is made more keen by different experiences which are met successfully. Regardless of their degrees of intelligence, all persons need to learn to plan. The habit of meeting all new situations in a planning state of mind is a

desirable asset, for the need of making plans exists whenever, at any time of life, an intelligent person encounters new experiences.

There are no exceptions to this rule; for regardless of education or native ability, each one must continue to learn to plan his work. In other words, the intelligent ordering of his work by an apprentice will not "come naturally," neither are there any "natural born" foremen or managers. Some may possibly have inborn qualities of leadership, but all must learn to plan in relation to the new details of their work. Planning requires knowledge, and knowledge is acquired gradually. Earnest study hastens this acquisition.

Free Time Should Be Planned

Every ambitious worker should plan his free time in order that his studies may have that attention which is absolutely essential to advancement. We should set aside a definite period of time in which to study. Then we should plan our studies to coördinate with our chosen employment. It is believed that the great majority of workers who are earnest students and who yet fail to advance in industry, fail because of having put in their precious time studying unrelated subjects.

The worker, eager to study, should beware of solicitors whose chief interest is a commission and who urge the less experienced to study this or that thing as a means of advancement. Machinists are urged to study to become draftsmen regardless of the fact that the draftsman's trade offers no better opportunity than the machinist's. Draftsmen are urged to study traffic management and so the endless urging goes on sometimes with slight opportunity offered the student other than to put in time studying volumes of unrelated subject matter, paying out hard earned money and possibly developing a permanent feeling of disappointment.

Reward Depends on Planning and Study

There is a constant increase in the extent of knowledge relating to each item of industrial work today. Safety, design



Class in coke oven practice at the Gary Works of the Illinois Steel Company. Courtesy of the Illinois Steel Company.

from a technical standpoint, cost control—all require foresight and knowledge. Henry R. Towne, formerly President of the Yale and Towne Manufacturing Company, in a graduation address at Purdue University more than twenty years ago, stated this situation well for engineers. His words are quoted because they apply to the worker in any part of the industrial system. “He who designs an unsafe structure or inoperative machine is a bad engineer; he who designs them so that they are safe and operative, but needlessly expensive, is a poor engineer, and, it may be remarked, usually earns poor pay; he who designs good work, which can be executed at a fair cost, is a sound and usually a successful engineer; he who does the best work at the lowest cost sooner or later stands at the top of his profession, and usually has the reward which this implies.”

Provided a worker likes his work, has physical health and is mentally alert, it is absolutely safe to predict a successful career for him if he will study subjects related to his work and apply his new information. This is the secret of all success. Study, however, must be accompanied by a first-hand knowledge of operations and processes.

INTEREST QUESTIONS

1. What studies do you believe would aid you most in your chosen employment?
2. Describe the planning of a certain job so as to show the different sources of knowledge needed.
3. Is it possible to plan in advance how to get along with persons who have seemed difficult on other occasions? Illustrate.
4. What time of the day do you believe is best for study of related subjects? Explain.
5. Name several industrial achievements of the last thirty years which in your opinion would not have resulted without careful planning.
6. Indicate several items of a plan for improving industry

in which health of employes when off duty should be considered.

7. What is thought? (*How We Think*, pages 1-6, by John Dewey).

READING REFERENCES

1. Bennett, Jesse Lee. *Frontiers of Knowledge*, particularly pages 26-31, in the American Library Association's *Reading with a Purpose Series*.
2. Brownell, Herbert. *General Science*, "Health and well-being," chapter III.
3. Dewey, John. *Democracy and Education*, "Educational values," chapter XVIII.
4. Hughes, R. O. *Economic Civics*, pages 34-35.
5. Myers, Charles S. *Mind and Work*, "Movement study," chapter I.
6. Shearman, Henry P. *Practical Economics*, "The hope of the future lies in science," page 26.
7. Taylor, F. W. *Shop Management*, Foreword by Henry R. Towne.
8. Wood, Charles Wesley. *The Myth of the Individual*, chapter VIII.

CHAPTER XX

The Economic Necessity for Individual Incentive—Improving Operations and Processes

Essentials of Economic Citizenship

Why should the average citizen be concerned about the improvement of industrial operations and processes? How does it concern the farmer whether or not an operation is eliminated in the production of steel rails? One person might answer that since rails are used to aid in transporting things farmers produce and consume, farmers must be concerned with the cost of production. Another answer might be that since the elimination of an operation merely results in increased profits, the farmer does not profit from the elimination, hence should not be concerned.

Within the scope of these widely different answers is found the great issues of economic citizenship. On one hand, if we take the position that citizens in general have no right to interest themselves in the improvement of industrial operations, we must abandon industry entirely to the judgments of owners and operators of the tools of production. On the other hand, it has been repeatedly demonstrated that "what is everybody's business is usually nobody's business."

Socialism vs. Exchange for Profit

Socialism urges the public ownership and operation of the means of production and distribution. It is questioned upon the basis of incentive for production which finds ultimate expression in improvement of operations and processes. Those who defend our present economic system point out that while it may not be perfect, it does furnish continual incentive for improvement of operations and processes. The method is simple. Economic goods are sold at a profit and the profits resulting from the exchange become the incentive for increasing profits by improvements.

This is where business functions in modern industry. Business methods are intended to assure profitable operation; hence, under our present system of production and distribution, profitable operation of industry is economical. It is equally true that unprofitable operation is uneconomical. It follows that to improve production and distribution, we must assure profitable operation, for profits are unquestionably an incentive.

Business, a Method of Distribution

Business itself is a tool or method of production and distribution of economic goods. This is its justification. So long as we continue to operate industry under what the socialist chooses to term the "Profit System," there is an economic necessity for maintaining individual incentives for improving operations and processes.

The primary object of these discussions is to help eliminate industrial waste, and this involves the basic fact that what is good for industry is good for industrialists. Upon this solid rock this series of discussions is anchored. Those who would be critical of this foundation should carefully consider the statement. It will have been observed that the statement does not read, "What is good for business is good for the industrialist," for this study apprehends the fact that business and industry are two quite different things. As has been previously said, industry is concerned with producing and making available the things that human beings want. Business while being unquestionably concerned with industry in all its modern application is after all merely concerned with a method by which we expedite the exchange of products.

If a business is rightly managed in the interest of all concerned, it would be entirely correct to say: What is good for the business is good for all those engaged in it. But all businesses are not so managed; hence we may not truthfully say, "What is good for the business is good for all those engaged in business."

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Business and Industry

On the other hand, industry being concerned only with supplying human wants, it follows that industrial improvements must result in easier and more complete satisfaction of human wants. But some one asks, "Who are the industrialists?" The answer is—every one engaged in supplying human wants. We should not confuse industry and business. Industry produces. It serves through business. Neither should we conclude that all business is bad nor that all industry is good. Without a doubt some human wants are questionable. At the present moment the population of the United States is quite divided upon the relative good and evil of the production and distribution of alcoholic beverages. Human wants are not human needs.

Business, a Tool of Civilization

We may have bad industries and bad business just as we do have much good industry and good business; but this does not alter the fact that, as a whole, what is good for industry is good for industrialists, for at no time is a majority of industrial operations and processes bad for human beings. If such a condition had ever obtained for any appreciable period in the history of production, the human race would have disappeared. Business may become generally bad with a consequent harmful effect upon human beings. If such a condition became permanent business would simply be discarded as a method of exchange. Something else would take its place. Business is merely a tool of civilization. There are some who assert that it is an outworn tool. The fact remains that it is universally used and whatever is designed to take its place must be able to function in all civilized countries simultaneously. The Russian experiment has proved this if nothing else.

Business Methods Necessary to Present Civilization

Business methods, wherein an exchange of economic goods is conducted for profit—that is, the so-called profit system

against which the socialist so vigorously protests, will not disappear some fine morning because of oratorical outbursts. Neither will business go out of style as the result of legislation. Oratory, legislation, revolution, persecution, and finally that last despairing measure of militant minorities, dictatorship, have all been tried out in Russia. Yet strange to say, according to Bertrand Russell, "efficiency for its own sake" rather than oratory, is intended by the bolsheviks, who have been aiming fundamentally at the Americanization of Russia. Nikolai Lenin did not try to disguise his intention to resort to drastic measures in organizing large scale industrial operations. In his book, *The State and Revolution*, the writing of which was interrupted by the November Revolution of 1917, he said:

¹ "We must organize production on a large scale, starting from what has already been done by capitalism. By *ourselves*, we workers, relying on our own experience as workers, must create an unshakable and iron discipline supported by the power of the armed workers; we must reduce the role of the state officials to that of simply carrying out our instructions; they must be responsible, revocable, moderately paid 'managers and clerks' (of course, with technical knowledge of all sorts, types and degrees). This is *our* proletarian task."

Why the Russian Experiment Failed

It will be noted that Lenin appreciated the need for technical knowledge of all sorts, types, and degrees. But it is one thing to make sweeping statements and quite another to achieve results. Step by step, the Russian experiment has retreated from the position announced so frankly by Lenin in *The State and Revolution*. Step by step, the old methods of exchanging economic goods have replaced communism, and it is all very largely because of the lack of incentive for the exercise of that very same "technical knowledge of all sorts, types and degrees" of which Lenin so courageously wrote in 1917. Henry Ford certainly knows something about produc-

¹ *The State and Revolution*, p. 156, published by Vanguard Press, 1926.

tion; furthermore, Mr. Ford sells goods to Soviet Russia and is economically interested in seeing Soviet orders for his products increase. In the light of Lenin's statement, Mr. Ford's recent comment is almost dramatic:

"Since 1914 a great many persons have received brand-new intellectual outfits. Many are beginning to think for the first time. They opened their eyes and realized that they were in the world. Then, with a thrill of independence, they realized that they could look at the world critically. They did so and found it faulty. The intoxication of assuming the masterful position of a critic of the social system—which it is every man's right to assume—is unbalancing at first. The very young critic is very much unbalanced. He is strongly in favour of wiping out the old order and starting a new one. They actually managed to start a new world in Russia. It is there that the work of the world makers can best be studied. We learn from Russia that it is the minority and not the majority who determine destructive action. We learn also that while men may decree social laws in conflict with natural laws, Nature vetoes those laws more ruthlessly than did the Czars. Nature has vetoed the whole Soviet Republic. For it sought to deny Nature. It denied above all else the right to the fruits of labour. Some people say, 'Russia will have to go to work,' but that does not describe the case. The fact is that poor Russia is at work, but her work counts for nothing. It is not free work. In the United States a workman works eight hours a day; in Russia, he works twelve to fourteen. In the United States, if a workman wishes to lay off a day or a week, and is able to afford it, there is nothing to prevent him. In Russia, under Sovietism, the workman goes to work whether he wants to or not. The freedom of the citizen has disappeared in the discipline of a prison-like monotony in which all are treated alike. That is slavery. Freedom is the right to work a decent length of time and to get a decent living for doing so; to be able to arrange the little personal details

¹ *My Life and Work*, pp. 4-5.

of one's own life. It is the aggregate of these and many other items of freedom which makes up the great idealistic Freedom. The minor forms of Freedom lubricate the everyday life of all of us.

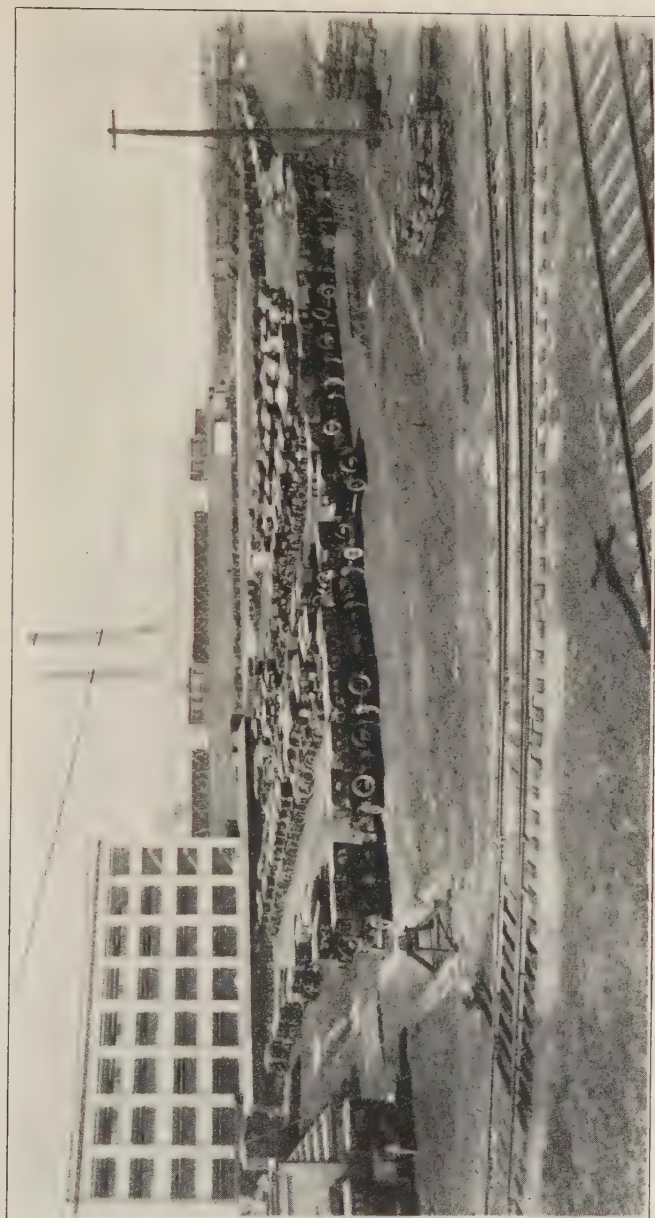
Incentive Essential to National Stability

"Russia could not get along without intelligence and experience. As soon as she began to run her factories by committees, they went to rack and ruin; there was more debate than production. As soon as they threw out the skilled man, thousands of tons of precious materials were spoiled. The fanatics talked the people into starvation. The Soviets are now offering the engineers, the administrators, the foremen and superintendents, whom at first they drove out, large sums of money if only they will come back. Bolshevism is now crying for the brains and experience which it yesterday treated so ruthlessly. All that 'reform' did to Russia was to block production."

What Is Good for Industry Is Good for All

But what has all this to do with the economic necessity for improving operations and processes? The answer is found in the peculiar fact that every one who has given serious thought to the question, from Ford to Lenin, agrees that what is good for industry is good for the industrialist and that any system of industrial management must recognize the economic necessity for continuous improvement of operations and processes.

If the profit system ever does fall, it will fall because it will have failed to continue to improve upon methods of production and delivery of economic goods. This is the test of business management of industry whether in a small factory or in a large industry. A good test of the soundness or unsoundness of any one of the many proposed economic remedies is the way its advocates answer the following simple question: "What provision is made in your proposal for assuring continuous improvement of methods of producing and delivering economic goods?"



Employees' automobiles parked beside the Hawthorne Works of the Western Electric Company, Chicago, Illinois. American workingmen have shared in American prosperity.

We Learn by Observing and Doing

Beyond the material benefits to be derived from individual response to improvement in industry, there is a spiritual and mental benefit from observation in connection with our daily work. Woodworth mentions this in discussing "Learning and habit formation," in his book, *Psychology: A Study of Mental Life*. He says:

¹ " 'We learn by doing' is a true proverb, in the sense that we acquire a reaction by making just that reaction. We *must* make a reaction in order to get it really in hand, so that the proverb might be strengthened to read, 'To learn, we must do.' But we should make it false if we strengthened it still further and said 'We learn *only* by doing.' For human beings, at least, learn also by observing.

"The 'insight' just spoken of consists in observing some fact—often some relationship—and the value of insight in hastening the process of learning is a proof that we learn by observation as well as by actual manipulation. To be sure, observation needs to be followed by manipulation in order to give practical mastery of a thing, but manipulation without observation means slow learning and often yields nothing that can be carried over to a different situation."

Industrial Improvement, a Result of Training

Promotion of operations and processes is an important duty of everyone in industry. Improvement of equipment will generally be found to result from an application of scientific information, such as mathematics, physics, and chemistry to the operations or processes at hand.

Improved technique is a result of continued systematic training. Once the principles involved have been mastered and a satisfactory series of operations planned, attention should be turned in the direction of the development of habits which will result in improved technique.

In the promotion of operations and processes, all workers will do well to avoid the mysterious. A mystery always

¹ *Psychology: A Study of Mental Life*, p. 317.

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signifies a lack of knowledge regarding principles or materials. When this knowledge is lacking, it is evident that the making of improvements in operations is impossible.

Growth Is Demonstrated by Improvement

It is apparent to any reasonable person that the growth of any business must depend upon the extent to which each person in the business functions as a promoter of operations and processes.

Men do not wait until the hour of death to begin to die. Men begin to die the moment they cease to grow.

The man who is content to do as well today as he did yesterday is "flirting with the production undertaker." We cannot stand still. *We must grow or go.* Production must go forward; it cannot go backward. Industry cannot stand still.

Right Incentives Encourage Growth

Consideration of the question of operations and processes from the two angles of production and of promotion is of special interest when attention is given to the differences characterizing the performance of operations under different types of incentives.

When men are bound to a job as under slavery they at best merely produce. When they produce through choice and in pride of service, they not only produce but tend to promote. This promotional attitude is most important both to individuals and industry.

Occupational Judgment and Improvement

Occupational judgment may be said to be developed by the worker through constant duplication of action and thought in common operations. Any operator will know how to deal with a situation over which he has held mastery for several years. A machinist may have learned that cast iron is brittle, or that a lubricant is not required in drilling cast iron. A carpenter may learn that hickory or oak is tougher than white pine. Each day after these things have been learned, the

mechanic may be called upon to use this particular knowledge. The possession of this knowledge does not require the exercise of a high degree of intelligence. He does exercise judgment, that judgment being a result of repeated experience. He knows a certain thing and that knowledge makes him a better carpenter or machinist. He has by experience acquired occupational judgment.

Occupational Intelligence and Progress

Occupational intelligence is called into practice when a person is confronted with a new situation for which he has no particular preparation. A pattern maker who has always made patterns to be used in molding cast iron may be called on to make a pattern for a brass casting. His experience has never included brass shrinkage; yet his experience with cast iron will cause him to question the shrinkage of brass. If, while his mind is thus stimulated, he receives instruction in related science, he will think beyond his past experience. Related science will enable him to borrow ideas for future investment. His judgment will not be based wholly upon his own experience. His decision will be founded upon reasoning with information gained from other sources in addition to his own limited experience. Investigation should result in greater efficiency. The pattern maker will have exercised occupational intelligence

Occupational Intelligence Should Be Stimulated

Occupational judgment is called into practice in meeting with an occasional familiar experience; occupational intelligence is an important consideration in research and in industrial promotion. If we want to learn and thus improve ourselves, if we are interested in the future progress of mankind, if we want to leave the world better than we found it, if we are genuinely interested in the great questions of government and humanity, we will demonstrate our interest by growing appreciation of the place of occupational intelligence in

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industry and the economic necessity for improving operations and processes. All manner of incentives have been tried. The most widely used is competition. Competition has frequently been condemned as a device for stimulating interest, but competition deserves much credit for industrial improvement.

Its abuse in some production incentive programs is due to failure upon the part of these managements to comprehend the harmful effect of continual stimulation. The effect is the same as in the case of the athlete who "goes stale" or is "burned out" from competitive strain.

INTEREST QUESTIONS

1. Select a simple job and list all the operations.
2. Why may the study of related science, mathematics, and drawing result in improvement of equipment?
3. Why do some operations offer greater opportunity for promoting industry than others?
4. Give an instance of the "mysterious" in your industrial experience.
5. List the habits which may be developed in the course of the performance of one simple operation.
6. What do you understand by occupational judgment? occupational intelligence?
7. Why is business said to be a tool of industry?
8. Why is it important to consider incentives for promoting production when considering methods of business?
9. Why is individual reward for individual achievement an essential in present-day industry?

READING REFERENCES

1. Cowdrick, E. S. Manpower in Industry, pages 3-6 in chapter I.
2. Dewey, John. Human Nature and Conduct, "Classification of instincts," part two, section V.

3. Ford, Henry, and, Crowther, Samuel. *My Life and Work*, "Why be poor?" chapter XIII.
4. Slosson, Edwin E. (Caldwell and Slosson) *Science Remaking the World*, "Gasolene," pages 12-46.
5. Taussig, F. W. *Principles of Economics*, vol. II, revised edition, "Differences of wages," pages 141-142.

CHAPTER XXI

Natural Selection in Industry— Competitive Coöperation

Two Kinds of Competition

When the law of supply and demand is observed as it operates in one factory at one time, it might seem that progress would be difficult. Conforming always to the demands of customers suggests to less experienced persons the danger of a business getting "into a rut." This danger is apparent rather than real; for human nature underlies demand, and capacity for progress or development is one characteristic of the race. At least three factors operate at all times to insure continual progress in industry. One is competition, another is scientific development of industry, and the third is salesmanship.

There are two kinds of competition—one affecting plants and whole industries from the outside, the other stimulating the plant or industry from the inside. The former kind is that which results from market conditions. The latter kind becomes a device to aid in the scientific development of production. The two forces of competition and scientific development produce the greatest advance when they operate together in close relation to the program of salesmanship of the organization.

Competition as an Aid to Coöperation

Competition has been said to be "the life of trade." It certainly has had a large share in the development of industry. No one would be willing to express disapproval of progress; and since competition results in progress, competition must be encouraged as an agent friendly to civilization. Competition indicates vigor. Competition in the industrial field is an indication of a healthy civilization. There is very little competition between persons who do not enjoy good health

while there is the keenest sort of competition between healthy children and robust young people. Competition is nature's way of insuring improvement.

Some persons have wrongly concluded that competition is opposed to coöperation. Nothing could be further from the truth. Two runners may compete strenuously while racing for a prize, but it is evident that their coöperation was necessary in order to conduct the race. The reason for failure of many of the so-called "coöperative movements" is found in the difficulty of establishing natural methods for selecting leadership. The greatest service of free competition is the accurate selection of leaders. The least experienced workman is a potential manager, and one of the ends of competition is furnishing him opportunity to demonstrate his greater usefulness. Since every workman is concerned with production in either a direct or contributory manner, his advancement must be through the maintenance or improvement of standards of production and this must focus in the labor and management of his own immediate job.

Competition and coöperation are essential in every business which is to survive. Competition from any outside source makes coöperation from within imperative. Competition may be said not only to be the life of trade, but it is also the father of coöperation. The more severe is competition between industries and business organizations, the more necessary is coöperation.

Scientific Development and Natural Law

Scientific development of industry is the evidence of recognition of the need for coöperation inside the industry or business organization. It manifests itself by a conscious endeavor upon the part of one or more persons to shorten the lines between starting points and goals. This line-shortening process may be indicated in many ways: A method may be found whereby the fuel burned in the boiler room may be used more effectively; the percentage of imperfect castings may be reduced in a foundry; or ways may be found to

improve the various operations encountered in doing certain jobs.

Scientific development in industry has been encouraged chiefly in two general directions: (1) In the improvement of equipment and (2) in the development of materials. We must not forget a third factor in industry, the human factor, whose development is essential to continued improvement in production. Industrialists in many instances have made good use of the laws of nature in the scientific development of materials and equipment. We are now learning that the human factor in industry may be best developed through the understanding application of natural laws. While we are learning that development of the human factor must be through understanding of human nature, we must also understand that every human being progresses, as does industry and civilization, by attention to the details of daily work. Oliver Wendell Holmes expressed this truth in "The Chambered Nautilus," in which the poet drew a parallel between the life of the nautilus in his snail-like shell and our own lives:

Year after year beheld the silent toil
That spread his lustrous coil;
Still, as the spiral grew,
He left the past year's dwelling for the new,
Stole with soft step its shining archway through,
Built up its idle door,
Stretched in his last-found home, and knew the old no
more.

Individual Development in Industry

When large-scale industry outgrew the small shops, it was feared that workmen would become mere "clock numbers" and that individual progress would be more difficult. This apprehension has been proved unfounded. The big highly competitive plant offers opportunities that the small shop did not possess. In the more competitive industries, where equipment and materials have been highly developed, the human factor is receiving increasing attention.

Ambitious young men who enter industry with the determination to make it their life work will find their power increased through their possession of a working knowledge of the methods of improving all three industrial factors. This understanding is essential in the practice of industrial economy. One of the first steps in acquiring this understanding is taken when we realize the forces which operate in industry to adjust its standards of production.

If we are to understand these forces, there are certain natural laws of which understanding must be had before we can be said to be in position to grasp the significance of natural laws in industrial growth. In other words, we must first lay a foundation of appreciation of natural law. The first law of growth is order, hence we may profit by a consideration of its application to industry.

INTEREST QUESTIONS

1. Give an illustration of competition and coöperation in connection with the doing of one job in which you assisted.
2. What is meant by "scientific development of materials and equipment"?
3. Give an example of the scientific development of a job in operation.

READING REFERENCES

1. Caldwell, Otis W. (Caldwell and Slosson). Science Remaking the World, "Achievements and obligations of modern science," pages 1-11.
2. Lincoln, Edmond E. Steps in Industry, "Business ethics," chapter XXXIX.

CHAPTER XXII

Orderliness in Industry as a Personal Asset

Maintenance of order is a recognized necessity in any enterprise. Order is the first law of growth. Discipline is necessary if order is to be maintained. There is a difference, however, between maintenance of discipline of others and the self-enforcement of discipline. Discipline should be self-enforced rather than enforced by others.



Street scene at Dorothy, Minnesota. Orderliness and civic pride are evident in many American mining towns.
Courtesy of H. C. Frick Coke Company.

If we are orderly in our habits, personal and otherwise, we will have laid the foundation for effective maintenance of discipline. That discipline which is the result of continual reproof is always maintained at the expense of the patience and energy of those who have heavy responsibilities in pro-

duction and this energy could be used to better advantage in other ways.

Officials of the Frigidaire Corporation and Delco-Light Company, subsidiaries of General Motors Corporation, in a booklet entitled "You and Your Work," published for the guidance of employees, speak with conviction upon the subject of orderliness:

¹ "There is an old saying—'A man is known by the company he keeps,' and here is another—'A man is known by the equipment he keeps.'

" . . . In fact, it is a very common thing to see two men from the same department, having the same chances, both with the same sized families, and one a success, the other a failure. Go to the home of one, and you will see the house and yard are clean and orderly. The furniture, fences and windows, as well as all other articles of equipment, well kept. Now go into the factory and you will find that fellow following the rules of success.

Orderliness Begins at Home

"Then go into the home of the other fellow. You will find dirt and disorder in the house, the yard looking like a dump heap. Some of the window panes out, the fence and walks in bad condition, all other equipment is in about the same condition. Now go into the shop and you will find the signs of a careless workman. Don't you see how these things work together? Yes, clean, orderly shops are the shops that succeed and grow, and give work to thousands of people. Dirty, disorderly shops are the ones that fail and have but little work to do. After you have looked over the classes of men and shops that you know, you will agree that:

Shops that succeed are clean, orderly shops.

Shops that fail are dirty, disorderly shops.

Men that succeed are clean, orderly men.

Men that fail are dirty, disorderly men.

¹ You and Your Work, pp. 16-17, Frigidaire Corporation, 1927. (Booklet)

"It must be true, if you want to succeed in life, you must first be clean and orderly."

Self-Discipline, the First Step

Few persons are incapable of self-discipline. Most persons prefer order to disorder in that in which they have any interest. The worker will do well to reflect upon this fact when going about his daily duties. It may be safely assumed that ninety-nine cases of disorderliness out of one hundred among young people are directly traceable to lack of interest in that specific item. Contrast the dress during social hours with the bench during working hours of certain young people, and this fact is evident.

With older persons, a lack of order may be traced to a number of other sources though interest is always a factor. A worker who has been conspicuous for his orderly work becomes a foreman without sufficient training, and his confused records and plans show no hint of his previous good trait. He has more details to keep in order than he has the ability to manage at first. He may work out a system and become as orderly in his new as in his old job. Or he may develop a partially successful method of work which dissipates a large percentage of his energy. Then habit fixes whichever method of operating he is following. This situation of fixed habits is frequently seen in the resistance to the introduction of cost control or technical improvements designed to make the conduct of business more systematic and orderly.

Orderliness and the Modern Myths

Finally, the great majority of people are confused or disorderly in certain places. These are the places where accurate information is lacking and yet in which experience and imagination suggest many conflicting ideas. The average person in the Middle Ages believed in dragons, monsters, witches, and other "unnatural" things, and this led to that disorder which is recorded in history as the Dark Ages.

There is another myth which is even now leading many of our young people away from the highway of right living

down into the swampy wilderness of disorderly thinking. It is the myth of what has been sentimentally termed the "New Freedom." Richard Washburn Child, discussing "Youth and felony," in his book, *Battling the Criminal*, says:

¹ "It appears to be the unanimous opinion of all who come into contact with the youthful wrongdoer today that the home has at this period a particularly hard job at hand. It faces an age when, for various reasons, the whole philosophy of freedom at any price and irresponsibility at any cost has been turned loose on the world. I have been amazed at this theory of irresponsibility, political, social, and personal, bred in Europe since the war. I have seen it degenerate art into mere drivelling expression and unite whole groups behind leadership proposing that the state should require no service of citizenship, but should in some magic way pay for every individual's idleness or delinquency. I have seen it induce a present generation of pleasure seekers to waste the physical inheritance which they hold in trust for a future generation. And coming home from service abroad, I have seen a nation with too much money to spend, too much ease, too much excitement and too much restlessness, tolerating soft and mushy philosophies about the rights of the individual.

A Literature of Discontent

"But in the main it is this nonsense which has made popular a whole modern school of literature called the Literature of Discontent. It is not necessary for the home to ban or censor a great deal of this, provided parents are sensible enough to present the ridiculous and laughable conclusions to be drawn from it. The silly side of this literature is that it is the literature of Eat Your Cake and Have It, Too. It depicts enslaved souls who break their bonds of drudgery, jump all moral fences, and land in that proverbial next pasture which always looks greener to the jackass. It is the philosophy of The Ticket for a Short Ride. The producers of such treatises,

¹ *Battling the Criminal*, pp. 74-76, published by Doubleday, Doran and Company, 1925.

Orderliness in Industry as a Personal Asset

novels, and plays fail to disclose that the tickets they sell will only put the passenger off at some ugly way station. They do not offer through tickets to the end of life."

Freedom through Obedience to Natural Law

Addressing the 1925 graduating class at Radcliffe College, Harry Emerson Fosdick said:

"Freedom of life is not to be found in freedom from the laws of living. The lawlessness of the American people is appalling. No other civilized country has so much crime which goes unpunished. In our moral life we are at a period that seeks for release from all restraint. If we were to look for a word to express the characteristic attitude of the new generation we should find it 'self-expression.' We are all out to get ourselves expressed. So in music, we have strange novelties and grotesques; in poetry, free verse; in morals, do as you please. An argument for self-expression will not help the man arraigned in court for expressing himself by an assault upon his neighbor. It is neither good morals, good religion, good law, nor good psychology to teach that some primitive instincts were given to us not to restrain, but to express. That teaching is only a caricature of psychology. It is an erroneous philosophy which tells us that we have only the choice of repressing our desires absolutely or letting them loose."

Freedom, Order, and Selfishness

There is a very definite relationship between true freedom and self-control. True freedom is to be found only in human service. In his poem, "Freedom," Lowell asks:

Is true Freedom but to break
Fetters for our own dear sake,
And, with leathern hearts, forget
That we owe mankind a debt?
No! True Freedom is to share
All the chains our brothers wear,
And, with heart and hand, to be
Earnest to make others free!

Orderliness and Personal Opportunity

Disorderliness is the foundation stone upon which our wild scramble for mythical liberties is based. That man who has formed habits of cleanliness and order is usually found to be a good citizen. Booker T. Washington, in the story of his life, *Up From Slavery*, tells an interesting story of his examination for entrance to Hampton Institute:

¹ "As soon as possible after reaching the grounds of the Hampton Institute, I presented myself before the head teacher for assignment to a class. Having been so long without proper food, a bath and change of clothing, I did not, of course, make a very favourable impression upon her, and I could see at once that there were doubts in her mind about the wisdom of admitting me as a student. I felt that I could hardly blame her if she got the idea that I was a worthless loafer or tramp. For some time she did not refuse to admit me, neither did she decide in my favour, and I continued to linger about her, and to impress her in all the ways I could with my worthiness. In the meantime, I saw her admitting other students, and that added greatly to my discomfort, for I felt, deep down in my heart, that I could do as well as they, if I could only get a chance to show what was in me.

"After some hours had passed, the head teacher said to me: 'The adjoining recitation-room needs sweeping. Take the broom and sweep it.'

"It occurred to me at once that here was my chance. Never did I receive an order with more delight. I knew that I could sweep, for Mrs. Ruffner had thoroughly taught me how to do that when I lived with her.

"I swept the recitation-room three times. Then I got a dusting-cloth and I dusted it four times. All the woodwork around the walls, every bench, table, and desk, I went over four times with my dusting-cloth. Besides, every piece of furniture had been moved and every closet and corner in the room had been thoroughly cleaned. I had the feeling that

¹ *Up from Slavery*, pp. 51-53, published by Doubleday, Doran and Company, 1925.

in a large measure my future depended upon the impression I made upon the teacher in the cleaning of that room. When I was through, I reported to the head teacher. She was a 'Yankee' woman who knew just where to look for dirt. She went into the room and inspected the floor and closets; then she took her handkerchief and rubbed it on the woodwork about the walls, and over the table and benches. When she was unable to find one bit of dirt on the floor, or a particle of dust on any of the furniture, she quietly remarked, 'I guess you will do to enter this institution.'

"I was one of the happiest souls on earth. The sweeping of that room was my college examination, and never did any youth pass an examination for entrance into Harvard or Yale that gave him more genuine satisfaction. I have passed several examinations since then, but I have always felt that this was the best one I ever passed."

Whether it be a former slave who is trying to gain an education or an employe of an industrial plant, cleanliness and orderliness will be found to be an asset. "Cleanliness is next to godliness," and no one has yet been found who is handicapped in industrial advancement by being reasonably clean.

Orderliness, a Result of Right Thinking

The common mistake in the cultivation of orderliness is to assume that order is merely a matter of keeping materials, machines, and ourselves neat and orderly in appearance.

No greater mistake can be made than to assume that orderliness is secured by keeping materials, equipment, and persons neat and orderly. As important as are these things, they are a result of right thinking. Disorder is a direct result of a certain mental attitude which is associated with waste. Mental discipline is the foundation of all orderliness.

A plan embracing the whole range of an individual's activities, very specific knowledge, and judgment are needed in order to decide the place where and improvement in order will be most productive of lasting results. As every successful execu-

tive knows, order in one place may be purchased at the cost of greater confusion in another or of friction which is still more wasteful of human effort.



Wash and locker building at the Vandergrift Works of the American Steel and Tin Plate Company.
Courtesy of the American Sheet and Tin Plate Company, Vandergrift, Pennsylvania.

Orderliness is the very foundation to a successful industrial career. We must learn in the beginning to develop a sense of the fitness of all things with which we deal.

A simple definition of order frequently heard is: "Order is having a place for everything and everything in its place." This definition has stood the test of generations and will apply as well in one industry as another. It needs to be interpreted so as to include far more than material things.

INTEREST QUESTIONS

1. From the standpoint of orderliness, how may a neat personal appearance assist a young man in obtaining a good job?
2. How would you proceed to develop habits of orderliness

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in yourself if you were convinced you had a tendency to be disorderly on your job?

3. What are four of the conditions you would inform yourself about before you began trying to help a person overcome certain disorderly habits which you consider very detrimental?
4. How may time be wasted through under-emphasis of orderliness on the job?
5. Is it possible to be orderly on a "dirty job?" Explain.
6. What, if any, is the difference between cleanliness and orderliness?
7. Where is orderliness most difficult to obtain? Why?
8. Give an example in industry of waste of materials resulting from disorderliness; of opportunity for improvement.

READING REFERENCES

1. Lewisohn, Sam A. The New Leadership in Industry, "The football of our emotions," chapter I.
2. Shearman, Henry P. Practical Economics, "Relation of economics to specialized economic studies," pages 5-6.

CHAPTER XXIII

Orderly Thinking as a Cure for Impatience— A Remedy for the Inferiority Complex—The Economic Value of a Sense of Humor

If we carry the idea of orderliness to its many-sided logical conclusions, we shall see that it reaches into every phase of human conduct. We read that "There is a time to laugh and a time to weep." This thought may be extended indefinitely as the person in industrial work asks himself seriously about the fitness of certain activities. Then he will reflect that some things should be introduced into industry with great care. With youth, this applies to items of personal behavior and work. With an older member of the group, it includes a larger range of activities and more people.

For example, every intelligent person knows that one is better off to avoid profanity in conversation. This is especially true of young men who wish to impress their elders with their modest attitude towards their jobs. The braggart and swashbuckler does not get very far in industry and his type is rapidly disappearing.

Orderliness and Domination

It is difficult to estimate the cost to industry from the needless exercise of what psychologists call the instinct of mastery or domination. Unquestionably, this instinct has a large place in human affairs and, constructively employed, is responsible for much of the human progress we call civilization; but when it is diverted into channels of mere annoyance, it becomes destructive and, therefore, uneconomical. When so employed, it is an evidence of childishness. E. L. Thorndyke, discussing "The original nature of man," says:

¹ "Teasing, tormenting and bullying are the most notable inborn exceptions to childish kindness . . . Teasing those

¹ Educational Psychology, Briefer Course, pp. 38-39, Teachers College, Columbia University, 1923.

who are unable or unwilling to revenge themselves then inevitably becomes a habit in the case of children of mean and brutal natures."

Impatience and Anger in Production

Various other habits result from the lack of understanding orderliness of thinking. William H. Burnham, in *The Normal Mind*, cites a case to indicate the harmful effect of impatience and anger. This example certainly is capable of innumerable applications in industry:

¹"A literary woman was unable to write for a period of a year, accomplishing in that time no more than she had formerly done in a month. She would sit at her table, begin to write, feeling her mind full of material, but no sooner had she begun than an inability to express herself would develop, quickly followed by impatience and finally by intense anger. When first questioned, she was unable to explain what took place save that she seemed to be hopelessly involved in her mind and simply could not obtain further results. Thus she was really unable to write because the foreign emotion of anger would steal in and take possession of consciousness.

"The doctor gave her a few simple explanations and advice. She was instructed to sit down at her table prepared to write; and if the ideas would not come, merely to continue sitting there. It was not to matter if she did not write a sentence during the hour, but under no circumstances was she to yield to any feeling except that of perfect serenity. She was to feel responsible only for the maintenance of the proper mental attitude. When she found herself sorely tempted to yield to impatience, she resisted this. 'Being a person of character, however, and having grasped the significance of the explanation in which the door being slightly pried open to admit one emotion the succeeding one would find easier entrance, she took pains to maintain her serene attitude, and in ten days was able to do her usual average of work'."

¹ *The Normal Mind*, pp. 431-432, D. Appleton and Company, 1925.

The "Bully" as a Cause of Industrial Waste

Protection from the anger and bitterness of a domineering person may not be overcome as easily as one's own anger. Industry is indebted to Charles Dickens for a characterization of the triangle of tormentor, tormented, and friend of the tormentor. In *Nicholas Nickleby*, we see a picture of the worst kind of organization, whether it be a school or a factory. Happily, these conditions are gone forever in school life and are almost never found elsewhere. But human understanding is relative and while cruelty asserts itself differently, there yet are found persons who in the light of present human standards may be compared to the domineering Squeers whose perverted nature demanded a Smike. In nearly every large group there is a Squeers; and we may depend upon it, every Squeers will have a Smike.

These Squeers may be found in every walk of life. They must always have some Smike to "pick on." Their understanding of the fundamentals of human relationships is wholly out of proportion to their instinct of self-assertion. Their own lack of ability is always evidenced by the fact that their Smikes are always persons in whom the instinct of submissiveness is overdeveloped. The Squeers and bullies of the world never single out a strong character for torment. Furthermore, the strong character, the highly intelligent person, does not have a Smike. The courageous, intelligent individual always endeavors to assist the weak and will feel regret when this weakness is such as to render assistance difficult or impossible.

The Value of the Inward Smile

There is a bright side to every human situation. There is a way out for every Smike. Burnham offers the weapon of defense against all the irritations of life. It is the inward smile. "Inward smile" is used here in place of smile for there are times when an outward smile might add to our difficulty. Not that the outward smile should not be cultivated. By all means, every human being should early learn to smile visibly. It is one of the distinguishing characteristics of a normal

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human being. Its value is beyond estimation. A friendly smile is inspiring. It overcomes fatigue. It increases coöperation and adds to the sum total of happiness of the human race. It is, however, the inward smile that counts the most. A friendly outward smile may transform another life and change the current of a day's affairs, but an inward smile transforms the soul. The inward smile is sometimes called a sense of humor. Different from the other senses but fully as useful is the sense of humor. Without this sense, we live in spiritual blindness.

The Sense of Humor and Success

Not every one today may find a friendly Nicholas Nickleby to fight his battles. But there is a friend at hand. It is our sense of humor. Dr. Burnham discusses it thus:

¹ "The American people have a sense of humor, and the psychology of humor is largely familiar; but its significance for mental hygiene has been neglected. One's sense of humor has an antitoxin function. It is the great mental disinfectant. Unfortunately, most of us lack a sufficient amount of this to disinfect the total content of our minds. . . .

"To speak more literally, one of the functions of humor is the removal of inhibitions. The humorist acquires a feeling of superiority from his ability to see the comic aspects of human activity and especially from his own witticisms. And for attacks that might cause a sense of inferiority, the humorous retort is the best defense. . . .

"A sense of humor is the sovereign prophylactic against the feeling of inferiority. . . . One may well fortify a child against this by developing a sense of humor; and this is one of the cases where we may well beware of destroying in childhood what is especially desirable as a characteristic of adult life."

Consideration for Others Is an Industrial Asset

Consideration of human attitudes and the characteristics

¹ The Normal Mind, pp. 399-400.

of Squeers and Smikes have a very real bearing upon the subject of orderliness in industry. Consideration for associates is the basis of all coöperation without which orderliness is impossible.

It may seem that this discussion is getting rather distant from economics, but it will be recalled that we started out with the assumption that orderliness is a result of constructive thinking. Furthermore, economics is a sort of basic science which penetrates all other sciences, and the first essential in a program of conservation of resources is an understanding of the human factor.

When should we speak harshly? When should we "bawl out" a fellow workman? We might as well ask, when should we yield to possible temptation to sharp practices? Every human being is confronted at times with the necessity to choose between the right and wrong, desirable and undesirable, in everyday conduct. His present judgment as to these qualities may differ from that of his fellow workers and, if he is alive mentally, is quite sure to be reversed in some cases by his later experience.

The Coöperative Spirit, a Fundamental of Orderliness

A man who thinks seriously about the fitness of his own actions can be depended upon to think also of the fitness of tools and materials and of the effects of his actions upon others. If a man forms a habit of trying always to fit into the organization and to get along with his fellows, it is safe to assume that not only will he have a place for everything and everything in its place on the job but he will have a comprehensive plan of action for himself. To carry out this plan most effectively, he must work with others. A coöperative spirit is the essence of orderliness and is the basis of order on the job and in the larger units of society.

Reference has already been made to the "losses and wastes due to the restraint and dissipation of the creative power of those who work in industry" as disclosed by the investigation

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of the American Engineering Council. These engineers were led to a conviction of the necessity for the addition of mental and moral forces to the physical resources now employed in industry. Orderliness of thought and action is a fundamental in this program. Interest, knowledge each of his own responsibility, hopefulness in planning and executing, and the formation of constructive industrial habits—all have a place in the study of industrial economy.

INTEREST QUESTIONS

1. What is meant by “needless exercise of . . . the instinct of mastery or domination”?
2. Give the examples of domination which in your opinion are economically justified.
3. Why is the “practical joker” a probable source of industrial waste?
4. Why is a bully usually referred to as a coward?
5. How would you apply the method cited by Burnham to your own work?
6. How may we proceed to discover whether or not we have a “Smike”? How may we overcome this tendency?
7. Give an example of how the sense of humor may be used to reduce fatigue.
8. What is the difference between a sense of humor and enjoying the embarrassment of an associate?
9. Give an example of how a sense of humor may overcome a feeling of incapacity or inferiority while not resulting in needless embarrassment to anyone else.
10. Suggest a plan for securing coöperation from some one who has seemed to require occasional “bawling out.” Endeavor to construct the plan without the use of such methods.

READING REFERENCES

1. Barnes, Julius H. *The Genius of American Business*, “The philosophy of fair play,” chapter II.

2. Franklin, Benjamin. The Autobiography of Benjamin Franklin, "Plan for attaining moral perfection," chapter IX.
3. Jewett, Frances Gulick. Control of Body and Mind, "Power through suggestion," chapter XXX.

CHAPTER XXIV

The Power of Constructive Thinking

We think in terms of our experiences; and, therefore, if we have had considerable experience with mechanical power, we are likely to think of power in such terms as steam, electricity or water. In fact, however, power may be variously manifested. Carlyle had this in mind when he said:

“Above all, it is ever to be kept in mind, that not by material, but by moral power, are men and their actions governed. How noiseless is thought! No rolling of drums, no tramp of squadrons or immeasurable tumult of baggage-wagons, attends its movements; in what obscure and sequestered places may the head be meditating, which is one day to be crowned with more than imperial authority; for Kings and Emperors will be among its ministering servants; it will rule not over, but *in*, all heads, and with these its solitary combinations of ideas, as with magic formulas, bend the world to its will! The time may come when Napoleon himself may be better known for his laws than for his battles; and the victory of Waterloo prove less momentous than the opening of the first Mechanics’ Institute.”

Constructive Thinking Insures Success

James Watt was a man of small stature who lived in a modest home in Scotland. He had very little money, only that which he had saved from years of daily toil.

George the Third ruled over Great Britain when the obscure James Watt worked in his little shop. The name of George the Third was known around the world. The name of James Watt was known to only a few of his neighbors in his home community. His fellow workmen and neighbors liked the well-behaved and hard-working Scotchman. No doubt, his friends predicted that he would one day be well-to-do, for his countrymen are noted for their appreciation of economy and industry.

If anyone had predicted that Watt, the mechanic, would one day be much better known than King George the Third, he would have been the laughing stock of the community; yet James Watt is known throughout the world today, and his name is used as a term of measurement of power; while King George the Third lives only in the pages of history and chiefly because of his mistakes. As the scroll of history lengthens, this king will be given less and less space, until at some future time historians will consider it sufficient only to record his name as having by accident of birth become King of England.



The chemical laboratory in the foundry department of Wentworth Institute. The laboratory is indispensable to many industries.
Courtesy of Wentworth Institute, Boston, Massachusetts.

“Jimmy” Watt was the first to use steam to operate a machine. He constructed the first steam engine. King George the Third was one of the curious who visited the modest shop to see the little steam giant about which many were talking. Stepping into the room where the little engine was pounding and puffing away, the pompous monarch said to Watt, “What have you here, my man?”—and James Watt, the mechanic, answered simply, “What kings covet—power.”

The Power of Constructive Thinking

The Most Powerful Thing in the World

Victor Hugo once said, "There is one thing stronger than an army, and that is an idea about to be born."

Thackeray wrote in *Pendennis*, "Ah, sir, a distinct universe walks about under your hat—"

Power referred to by Watt, Hugo, and others may be defined as influence. To the extent that we exert influence, we have power; and to the extent that we are able to release and direct energy, whether it be mechanical or human, we are powerful.

Power is the rate of doing work. So far as production is concerned, the steam in a boiler must be released and directed into certain channels in order that steam power may be utilized. This is true also of human power. The mere fact that a man is large of stature or even possesses a so-called education in addition to physical strength does not insure that he is powerful. Whether we speak of mechanical or human power, we must consider it in relationship to work; and in industry, work is undertaken for the purpose of producing the fundamentals of life.

Two Kinds of Power

For purposes of this discussion, power is classified as man-power or mechanical power. Under these two classifications, we find a number of channels through which power may be applied to production. Elsewhere in this series, mechanical power is treated more specifically as a unit of cost. This specific treatment will necessitate slightly more specific definition in order to identify the items of expenditure. This treatment is suggested in one of the reading references in this chapter. Power is considered more generally here.

POWER IN PRODUCTION

<i>Man power</i>		<i>Mechanical power</i>	
Attitude	Actions	Hydraulic	Electric
Thought	Habits	Steam	Chemical
Reading	Speech	Atmospheric, etc.	
Discussion	Coöperation		
Study	Coördination, etc.		

Energy and Power

Energy may be released either constructively or destructively. The effect of power in production depends entirely upon the manner in which the energy is exerted. There is energy in the white flame of an oxy-acetylene torch which if used wisely is constructive. If it is used to burn metal upon which the strength of equipment depends, it becomes an instrument of destruction.



View of main building, Antioch College, Yellow Springs, Ohio. An educational powerhouse.
Courtesy of Antioch College.

We may think destructively or constructively. Destructive thinking is unproductive from an industrial standpoint.

The Power of Constructive Thinking

Some one has said, "Sow a thought, and you reap an act; sow an act, and you reap a habit; sow a habit, and you reap a character; sow a character, and you reap a destiny." We pass through life by the way stations of attitude, thought, action, habit, character, and destiny. Each new experience is usually encountered in the order of attitude or "mental set," thought, action, and habit. It is, therefore, of great importance to have a constructive attitude and to think constructively at all times. Constructiveness in thinking is certain to result in increased opportunity for those who practice it.

Constructive Thinking vs. Destructive Thinking

Robert Louis Stevenson's vivid story, *Dr. Jekyll and Mr. Hyde*, is a description of the struggle between constructive thinking and destructive thinking. The terrible fate of the poor human wreck is typical of the final outcome of all those who give themselves up to long continued destructive thinking.

Every human being is a unit of potential energy. The moment a little child pushes his hand against the crib he is exerting power. When we speak for or against an idea, we exert power through speech. When we smile encouragement to others who are having difficulty in doing useful work, we exert the power of kindly understanding. When we smile unkindly at the misfortune of a fellow workmen, we are interfering with production. We are either constructive or destructive in our actions, our thinking and in our attitudes; and by force of habit, we shall grow in one direction or the other.

Mental Attitudes and Economy

Economy begins in the cultivation of a constructive mental attitude. If we have the spirit of economy, we will naturally endeavor to do that which will decrease waste. We observed in an earlier chapter that "Knowledge is power"; and power as a result of knowledge should be, through the application of judgment in experience, the end of all study and discussion.

Whether we are operating a machine in a workshop or performing any other one of a thousand duties incident to production we should bear always in mind that we are exerting power in production. Our every effort will fall either upon the debit or upon the credit side of the ledger of industrial enterprise. Gradually, hour by hour, day by day, we are preparing our record. Either we are filling in the pages of our book of life with the red figures which represent our failures to achieve or we are recording successes to the credit of ourselves and the enterprises in which we are engaged. We cannot dodge the issue. Every living human being has power, and its effect upon the production of the fundamentals of life is the measure of our opportunity and our service.

Opposed to the philosophy of orderliness and constructive thinking as a basis for all progress and human development is the theory of the supremacy of chance. This theory is voiced, among others, by Ernst Haeckel in his otherwise remarkable book, *The Riddle of the Universe*. The law of chance lends authority to accident and reminds us of the importance of the relationship of accident prevention to orderliness in industry.

INTEREST QUESTIONS

1. What is power?
2. What are some differences between manpower and horse power as they are understood in mechanics?
3. What is an idea? Explain how an idea may have power to hinder production; stimulate production; prevent waste.
4. Does an apprentice have more or less power to affect production than a skilled workman? Why?
5. Give three examples of destructive thinking in relation to production.
6. Give three examples of constructive thinking in relation to production.
7. Which is the more expensive—the waste of power through leaky steam pipes or through misdirected thinking of workers? Why?

The Power of Constructive Thinking

8. Name three ways in which human energy may be exerted destructively; three ways in which it may be exerted constructively.
9. Name three ways in which mechanical energy may be exerted destructively; three ways in which it may be exerted constructively.

READING REFERENCES

1. Barton, Bruce. *The Man Nobody Knows*, "The founder of modern business," chapter VI.
2. Cowdrick, E. S. *Manpower in Industry*, "The employment function: Job analysis," chapter VIII.
3. Dewey, John. *Human Nature and Conduct*, "Changing human nature," part two, section III.
4. Ford, Henry, and, Crowther, Samuel. *Today and Tomorrow*, "We are being born into opportunity," chapter I.
5. Johnson, Joseph French. *We and Our Work*, "How wealth is produced," chapter VIII.
6. Moxley, Edward P. *Principles of Factory Cost Keeping*, "Accounting for labor," chapter III.

CHAPTER XXV

Safety First and First Aid—The Relation to Industrial Economy

Accidents in General

Dr. L. I. Dublin, Statistician, Metropolitan Life Insurance Company, spoke at a meeting of the National Safety Council at Detroit, Michigan, October 29, 1926, upon the subject, "An untilled field in safety work." An extract from the address with the data revised by him to include the year 1927 reads:

"For the past twenty years a systematic and effective movement had been under way for the prevention of accidents and injuries in our workshops and factories. Here results have been definite and gratifying; for the industrial safety engineer has been able to reduce materially the number of serious injuries in industry. The movement for the protection of life and limb on our streets and highways has also gotten off to a good start under the auspices of the National Safety Council and the two conferences on street and highway safety which have been held under the auspices of Secretary Hoover of the Department of Commerce.

"Practically nothing has been done, however, to bring under control the 20,000 to 25,000 deaths occurring each year in the American home. The largest single items in this list are burns, falls and poisonings by gas. More than a third of these fatal accidents in the home occur among children under 15 years of age and a little more than a fourth are found at the age ranges above 65 years. Adult women, as might be expected bear the brunt of these domestic accidents.

"During 1927, there occurred 3,274 deaths from automobile accidents among the more than eighteen million Industrial policyholders of the Metropolitan Life Insurance Company. These deaths constituted more than two per cent of the total

mortality among this important cross-section of the population.

Industrial Accident Rate Decreasing

“During this same year, accidents of all kinds, caused the loss of 11,397 lives in this insured group. That is, for every 100 who lost their lives in accidents of any kind, there were 29 victims of motor vehicle casualties. The following comparisons are illustrative of the relative importance of automobile fatalities, as compared with deaths due to other forms of accidents. There were $2\frac{3}{4}$ deaths in automobile accidents to every one drowning and about $3\frac{1}{2}$ to every fatality caused by accidental burns. There were more than 2 automobile fatalities to every death from accidental falls, which ranked next in importance, numerically, among all the accidental causes. The ratio of deaths in automobile accidents to those on steam railroads was about $4\frac{1}{2}$ to 1; that to inhalation of poisonous gases of all kinds was more than $7\frac{1}{2}$ to 1; that to accidental gunshot wounds almost 11 to 1, and to machinery accidents of all kinds more than 14 to 1. The automobile death toll among urban wage-earners and their families exceeded the combined total from burns, drownings and street railway accidents.”

Thus, it is seen that one may meet with an accident in the home, on the street, or in an office as well as in industry. Furthermore, the industrial accident rate is being reduced by “safety first” methods and will be still further reduced as education in industry proceeds.

This is mentioned preliminary to serious discussion of industrial accidents to give readers a basis for evaluating occupational hazards and an appreciation of industry as becoming by comparison a safe place in which to be employed.

While we should lend our assistance in reducing the rapidly mounting death and injury rates from automobile accidents, we must, as students of industrial economy, seriously consider the economic value of industrial accident prevention.

The Cost of Industrial Accidents

Mr. Sidney J. Williams, writing in *Waste in Industry*, pages 331-332, says:

"Accidents contribute to industrial waste in three ways:

1. The loss of productive labor on the part of workmen who are killed or injured, together with the cost of medical and surgical attention and the overhead cost in connection with the payment of claims.

2. The indirect loss of production due to the stoppage or slowing up of work when an accident occurs. This applies not only to the operation at which the man is injured, but also to other operations dependent thereon. It applies also to 'near-accidents' in which no personal injury occurs.

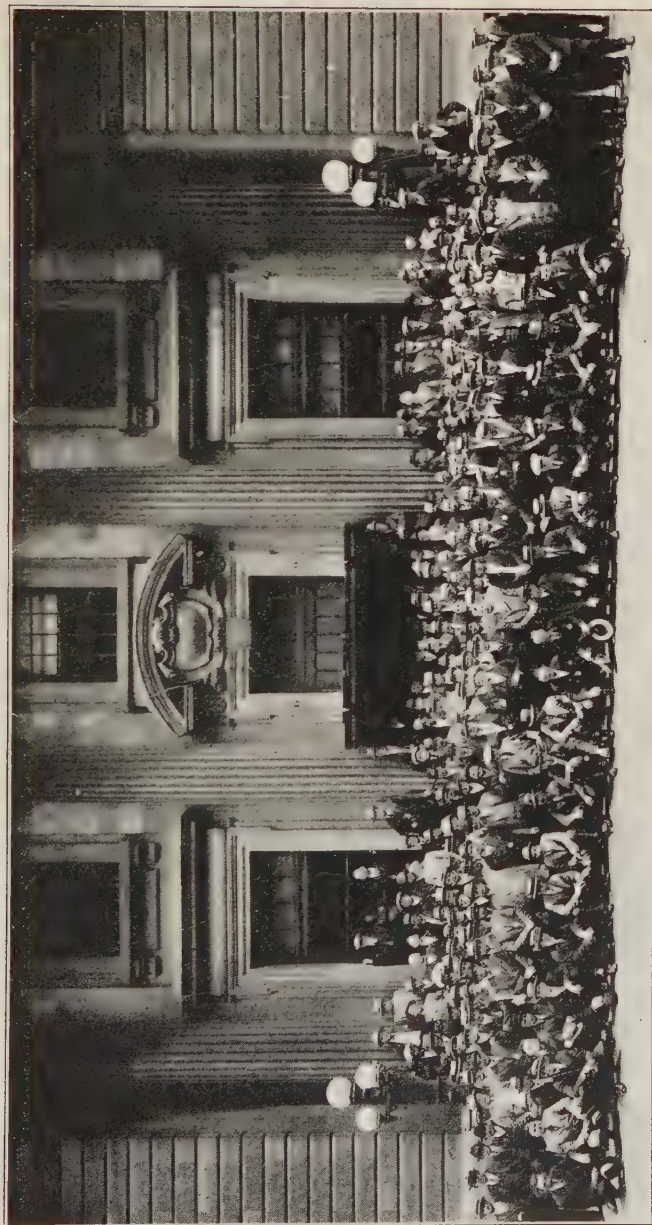
3. The injurious effect of frequent accidents on the morale of workers. Conversely, it may be noted, successful accident prevention work leads to improvement in labor relations.

"In 1919 there occurred, in all the industries of the United States, about 23,000 fatal accidents; about 575,000 non-fatal accidents causing four weeks or more disability; about 3,000,000 accidents in all causing at least one day's disability. The figures for 1918 were about 13% higher.

"The time lost as a result of these accidents may be computed as follows:

	Days
Actual time lost in 2,977,000 non-fatal accidents	50,000,000
Loss of future earning power as result of complete or partial permanent disability resulting from 115,000 accidents included in above, equivalent to	108,000,000
Loss of earning power resulting from 23,000 fatal accidents equivalent to	138,000,000
Total	296,000,000

"If we may assume an average wage of \$4 per calendar day (\$28.00 per week) the above time lost represents a wage loss of \$1,184,000,000. From this we may subtract the actual cost of subsistence of the men killed, which may be placed at approximately 60% of their wages, or about \$331,000,000. This



General safety meeting. Courtesy of Elgin, Joliet and Eastern Railway Company.

leaves a net economic loss to the country of about \$853,000,000 for the year 1919.

"A part of this loss is borne by the employer in the form of payments under workmen's compensation laws, made either direct to the workman or in the form of insurance premiums. The remainder is borne by the workman himself and his dependants.

Young men who enter industry will find well-developed "safety first" programs in many plants, and an understanding of certain fundamentals of accident prevention will be of value to employes who seek advancement. For this reason the subject is discussed analytically.

Classification of Accidents

Accidents differ with regard to avoidability and unavailability according to the location of responsibility.

All accidents should be divided into two principal groups:

1. Avoidable accidents.
2. Unavoidable accidents.

From the standpoint of the person who knows and can use a means of prevention, the accident may be said to be avoidable. From the standpoint of a person who may not know how, or who is powerless to prevent the accident, it may be said to be unavoidable. An accident classed as entirely unavoidable is, therefore, one the responsibility for which cannot be located.

It naturally follows that the classification of a particular accident is not a fixed affair and that unavoidable accidents may be transferred to the avoidable group whenever the responsibility can be fixed. It follows also that the same accident is avoidable from the standpoint of certain persons and unavoidable from that of others.

An example of an accident that could be classed as wholly unavoidable is an explosion that occurred some time ago in a starch factory in the middle West. A careful investigation failed to reveal its cause and so the exact location of responsibility was impossible.

An example of an accident which might be considered unavoidable from one person's angle and avoidable from another's would be one resulting from the bursting of a grinder wheel operated at too high speed. The accident may rightly be considered avoidable from the standpoint of the person responsible for the fixing of speeds of the particular grinder. From the standpoint of the worker, the classification of the accident would depend upon whether or not he is powerless to control conditions.

It becomes the duty of persons interested in safety first administration to fix responsibility wherever possible and thereby reduce the number of so-called unavoidable accidents. This requires a knowledge of causes and possibly research work or the use of the results of the investigations of others.

The first step in any constructive safety program is the fixing of responsibility for prevention of all accidents which are known as avoidable. This step is inseparably associated with the finding of the various possible specific causes of accidents and the organization of personnel so that each one from manager to worker knows which ones of these specific causes are within his own control.

The next step is the use of all possible educational means in a program of transferring unavoidable accidents to the avoidable classification. Just here it must be remembered that an axiom in industry is "No one does as well as he knows." Knowing how to prevent difficulties is not sufficient, so another step is necessary in the reduction of the material and human loss from industrial accidents.

This final step is the adoption of a program looking toward the removal of the causes of avoidable accidents whenever possible, and the inauguration of policies intended to reduce the possibility and extent of injury from unavoidable accidents.

Avoidable Accidents

Avoidable accidents may be classified as follows:

1. Avoidable accidents due to carelessness.
2. Avoidable accidents not due to carelessness.

Carelessness may be understood as that attitude of mind which is a result of a lack of appreciation of the rights and interest of self or of others.

Avoidable Accidents Due to Carelessness

A common remark heard following an accident is, "I knew better," or "He knew better." It is a human characteristic to be neglectful.

Persons who neglect to safeguard themselves and others against a recognized danger constitute a constant menace to the industry and to their associates. In spite of the fact that people generally protest against carelessness and that foremen and workers everywhere are unanimously of an opinion that carelessness is inexcusable, the fact remains that thousands of accidents occur daily as a result of carelessness.

Carelessness may result in avoidable accident because of:

1. Underestimation of dangers.
2. Unconcern for surroundings.

Underestimation of danger is a result of lack of understanding of the seriousness of the hazard and is not to be confused with ignorance of the existence of danger. It is assumed that the one who is guilty of carelessness does understand that danger exists. Lack of understanding of the seriousness should be understood to mean that the person recognizes the danger but minimizes the importance of exercising caution.

The only treatment for persons afflicted with underestimation of danger is instruction in relative risks. The underestimation of danger from infection is just as dangerous to health and economy as is the underestimation of danger from machinery.

Workers should understand that the final result of an accident does not always depend upon the immediate seriousness of the injury. Workers often neglect to give proper attention to a "mere scratch" and thereby help to increase the business of the artificial limb factories. The experienced person knows that any injury may become a serious injury.

The famous remark of General Wayne—that "The only

good Indian is a dead Indian"—should be changed for safety first purposes to read: The only safe situation is the situation in which there is no possibility of accident.

It is not enough to be careful in the face of a great danger—the safe workman must avoid possibility of accident. The only risk worth running is that risk which cannot be avoided. To court a danger because it is slight is an evidence of a foolish mental attitude.

Systematic Training Needed

Evidence of carelessness because of underestimation of dangers should be positive proof to industrialists of the need for safety first instruction. The one who ignores evidence of carelessness due to underestimation of danger is neglecting his duty toward both workers and the management.

Production which is increased by underrating dangers is production gained through false pretenses. Unnecessary risks, however slight, should not be allowed to pass unnoticed. The only way to avoid the big accidents is to begin early to avoid the little ones. It is much better for the worker to be called a "mollycoddle" because he is sensible than to be called a hero for acting foolishly.

Unconcern for surroundings is a manifestation of carelessness which may carry with it a multiple loss. If the worker is forgetful of others during his performance of an operation, he may injure or be injured by those he has forgotten.

This kind of carelessness is frequently a characteristic of the energetic, willing worker. Because of this fact, it is all the more important that the worker should be saved from his own absent-mindedness. The worker should be trained to give just the right amount of attention to his job and to the other jobs which affect his safety. But too much attention to jobs other than his own will slow up production and accomplish no good end.

Avoidable Accidents Not Due to Carelessness

Avoidable accidents not due to carelessness within the meaning of this topic may be said to include all those which are

the result of ignorance of hazard. An instance of an avoidable accident not due to carelessness might be the result of an attempt of a truck driver to turn left when this is forbidden. If the driver's failure to observe the traffic rules was due to ignorance of regulations, the accident would be said to be an avoidable accident not due to carelessness. The driver would be a fit candidate for instruction in local traffic regulations.

The Prevention of All Kinds of Avoidable Accidents

The discussion of any program for prevention of all kinds of accidents which can be avoided by any means at present available emphasizes the value of one activity—the education of the persons who are responsible in each case.

In support of organization and education for safety first, the following table is taken from the book, *Liability and Compensation Insurance*, by Ralph H. Blanchard. The figures were supplied by Robert J. Young, Manager of the Department of Safety and Relief of the Illinois Steel Company. The figures indicate the relative percentage of efficiency of various methods adopted by that company in their safety first campaign during which accident rates were reduced 85%.

Organization—

1. Attitude and personal work of those in authority	30%
2. Safety committees	20%
3. Inspections (not by committees)	5%
	55%

Education—

4. Instruction to employes	12%
5. Bonuses, prizes, etc.	8%
6. Talks by superintendents, foremen and others	3%
7. Signs	2%
	25%

Safeguarding—

8. Safety devices	12%
9. Lighting devices	5%
10. Cleanliness and order	3%
	20%

The Best Safety Methods

In summing up the various items presented by Mr. Young, it is found that organization and education were credited with being responsible for 80% of the reduction in accident rates. The "attitude and personal work of those in authority" credited with 30% of the accident reduction is considered as "Organization" in this report but is certainly within the scope of true education.

Persons who seek to shift the burden of their responsibility to the mechanical safeguard can readily understand from this report how ineffective will be their safety first administration. Safeguards have their place and are a vital necessity, but it should be remembered that it is impossible to make machinery "foolproof."

Another deduction from the above table is that safety first talks may be expected to accomplish only limited results in the reduction of accidents.

In concluding the discussion of avoidable accidents, it may be said that accidents due to negligence and to ignorance of workers, fellow workers, and employers may be safely assumed to be material for organization and education work in safety first. This education, especially in its research features, may include also the prevention of many accidents at present considered unavoidable. This is an economic question involving not less than a billion dollars annually in the United States according to one authority—to quote accurately, "not less than \$1,014,000,000." The economic significance to employes, employers, and the public is seen in the following excerpt from *Waste in Industry*, pages 22-23, from which this estimate of a billion dollar loss has been taken:

"In one state (Wisconsin) the costs to employers for medical and surgical aid and hospital bills, and the overhead expenses of insurance equalled 86% of the actual compensation paid to workmen. The compensation paid the workmen was about 22% of the total actual and prospective wage loss. Records from other states indicate that this is probably typical. On this basis the total direct cost of industrial accidents in the

United States in 1919, including medical aid and insurance overhead, was not less than \$1,014,000,000. Of this amount, \$349,000,000 was borne by the employers and \$665,000,000 by employees and their dependents.

"These approximate figures are low because they do not include medical expenses incurred by workmen and not paid by the employer or insurance company; overhead cost or personal accident insurance carried by workmen; cost of training new men to take the place of those injured; employment and welfare department expense in keeping track of injured workmen and their families. The addition of these items would bring the total well over a billion dollars per year.

"In this calculation no account has been taken of the indirect loss of production due to the stoppage or slowing up of work when an accident occurs. This affects not only the operation at which the man is injured, but associated operations as well. It applies also to 'near-accidents' in which no personal injury occurs.

"Experience indicates, and authorities agree, that 75% of these losses could be avoided, with a saving in direct, clearly ascertained losses alone of a quarter of a billion dollars per year to employers, and half a billion to employees."

Unavoidable Accidents

When accidents have been classified as far as possible according to the responsibility for prevention, there will be found to remain some which must at present be classed as unavoidable. Some accidents occur for which a cause cannot be assigned. The mere fact that the cause of an accident cannot be located is no excuse for failure to protect workers against a known danger.

Unavoidable accidents may be safely assumed to be largely due to the present hazards of industry.

The following figures are offered for comparative purposes from Senate Document 110, Vol. IV, pages 174-175, Report on Labor Conditions in the Iron and Steel Industry, in which an attempt is made to record the causes of accidents. The

five causes, together with their relative frequency, make an interesting study.

1. Hazard of industry.....	60%
2. Negligence of worker.....	7%
3. Negligence of fellow-worker.....	6%
4. Negligence of employer.....	4%
5. Not disclosed by the record.....	23%

The mere statement that 60% of the accidents in a plant may be classified as due to hazard of industry is not to be taken to mean that these 60% are unavoidable. Certainly, some are unavoidable at present; but the organization and education which offer reasonable assurance of a large reduction of accidents will be more effective if accompanied by scientific study of the causes of accidents. Education in accident prevention will do much to decrease the percentage of accidents which now are classed as hazards of industry. In other words, ignorance of risks is accepted as one of the prevailing hazards of industry.

Every hazard in industry is a challenge to research workers and industrialists whose vision includes all three factors in the huge loss to which reference has already been made.

Accident Frequency Points

Certain facts bearing upon the frequency of accidents may serve as a guide to interested persons in the study of causes of accidents. It is easier to fix the responsibility for prevention and determine the cause when comparative frequency records are studied. Figures gathered in 1914 by the Massachusetts Industrial Accident Board reveal among other facts the following:

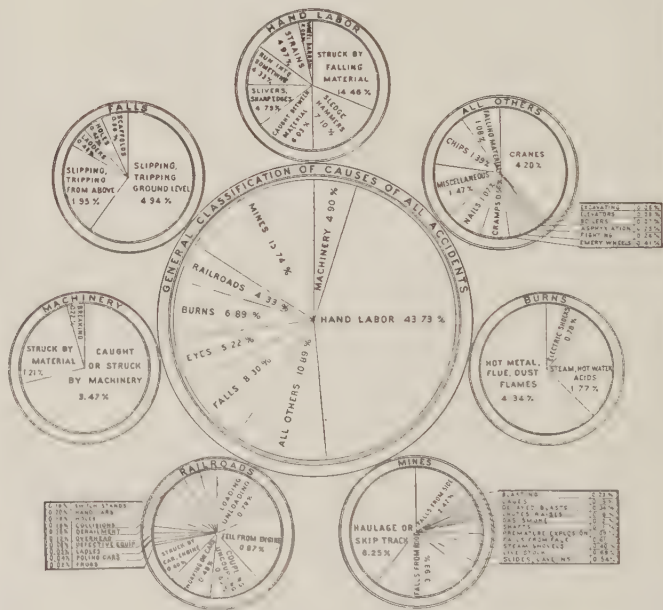
1. The largest number of accidents occurred between 10 and 11 A. M. and 3 and 4 P. M.
2. The average duration of disability was 12.48 days.

To these two points may be added the following:

- A. Thirty-day workers were injured six times as frequently as experienced employes.
- B. Workers employed less than six months were injured four times as frequently as other employes.

CLASSIFICATION OF CAUSES OF ACCIDENTS

284,494 Accidents Classified as to Cause



NOTE—Hand labor caused nearly one-half of all accidents. A majority of these accidents cannot be controlled by the use of safety devices and appliances.

From The Annals, January, 1926, page 89, through the courtesy of the publishers and the author, Mr. C. L. Glose.

The following information on accident frequency for foreign born and for night workers is taken from Bulletin No. 256, Accidents and Accident Prevention in Machine Building, issued by the United States Department of Labor, Bureau of Labor Statistics:

"In the first report of the Bureau on accidents in the iron and steel industry, a careful study was presented of the comparative accident rates of English speaking and non-English speaking workers, the basis of the comparison being the experience of a large steel plant over a period of years. The result of that study shows . . . that while the accident rates were reduced for non-English speaking steel workers as well as for those speaking English, the improvement in the case of the non-English speaking workers was much less definite and much less steady.

"It is not to be concluded from this fact that the evident handicap upon the non-English speaking employes is entirely due to their inability to understand directions and orders. This is unquestionably a factor in their less favorable accident rate. But another factor also enters, namely, that the non-English speaking workers, as a rule, suffer from lack of experience and thus are found largely in the group of unskilled occupations involving inherently high accident hazards.

"The excess in night frequency rates is very marked for both non-disabling and disabling accidents. Combining both classes of accidents, the frequency rate appears as 413.59 cases for day workers as against 624.29 cases for night workers. The night rate is thus almost exactly fifty per cent higher than the day rate."

First Aid

It is customary to believe that the less said by anyone outside the medical profession on the subject of first aid, the better. There are, however, certain phases of the subject which cannot be neglected in any study of industrial economy. This discussion will be confined to those questions which may be safely considered by persons who, though without medical or surgical training, are concerned in the conservation which may be accomplished through the administration of first aid programs.

Company Policy

Each employe should know his company's policies regarding first aid to the injured.

First aid is sometimes considered sentimentally in the factory and workshop. Sympathy is aroused when an accident is witnessed. The injured one receives the attention of everyone who can be of assistance and of many others. All that may be done to alleviate pain, to save life, and to hasten recovery should be afforded the injured. Such action at these times improves the fraternal feeling so necessary to the maintenance of a fine working spirit. Like everything else, this manifestation of sympathy can be overdone. It should be borne in mind, that the injured person is not nearly so much in need of sympathy as of care.



A. C. I. P. Co. medical dispensary.
Courtesy of American Cast Iron Pipe Company, Birmingham, Alabama.

First aid assistance should be organized assistance. If medical attendants are not present, certain persons in every group should be prepared to administer temporary aid. All such assistants should be selected and instructed by the physician in charge.

In case of accident, it is natural for everyone in sight to gather about the injured person. There are two important reasons for not "ganging up" about an injured worker: First, the injured one is in need of air; second, it is of utmost impor-

Safety First and First Aid

tance that the injured person remain calm and unexcited. It is the height of refined cruelty for friends to gather about a fallen shop mate, their faces registering pity, while speaking in mournful tones about the accident. It is surprising how many workers survive these ordeals and return to their jobs and families.

If a company policy is inaugurated to prevent crowding about injured workers, it becomes the duty of every employe to carry out this policy. Workers should realize that the company's policy is intended as a humanitarian measure.

Infection

Many accidents are in themselves unimportant, but result in extended illness and loss of time to the family and the business. In most instances, these apparently simple cases are traceable to infection resulting from unclean bandages or from the use of nostrums and "cure-alls." Cleanliness should be the first law in first aid.

Too many injuries are "treated with contempt" in factories. Foolish young persons sometimes think that it is a sign of strength to ignore slight injuries.



Base hospital of the Oliver Iron Mining Company, Hibbing, Minnesota.
Courtesy of the Oliver Iron Mining Company.

An analysis was made in 1926 of the hospital records covering six years at the Laidlaw Works of the Worthington Pump and Machinery Corporation, Cincinnati. These six years were divided into three periods according to the personnel and policies of the medical department. The period in which the largest number of total injuries was reported indicated the greatest faith of workers in the medical department.

This faith was indicated by the general willingness of workers to make use of the facilities of the medical department for even the most trivial injuries. During this period when the largest number of injuries was reported, there was the lowest ratio of lost time to no lost time injuries. This smaller proportion of severe injuries would be expected to result from an increase in the number of no lost time injuries reported. But the effect of using the medical department's facilities in the treatment of many no lost time injuries had a favorable effect upon the severity of the lost time injuries.

The period of the most frequent reporting of minor injuries was also the period of the lowest severity of lost time injuries. Expressed in terms of 1000 hours worked, the severity of lost time injuries for this period of high minor injuries reported was .50 as compared with .83 and 1.26 for other periods.

Confusion

Confusion is sometimes a cause of loss of life during administration of first aid. Prevention of confusion is without doubt one of the duties of every industrialist. Everyone should remain calm and continue to think clearly in all the strains of industrial activity.

The most common cause of confusion is dual authority and consequent conflicting orders. The one charged with leadership during the administration of first aid should see to it that he and he alone is the one to issue orders. It is the duty of everyone in the plant upon request, to lend to this person every assistance. A kindly but not sentimental attitude should be displayed during the whole time.

Some rules for avoiding confusion are as follows:

Speak calmly.

Speak distinctly.

Speak just loudly enough to be heard distinctly.

Be sparing of sympathetic expressions.

One final duty devolves upon everyone following the occurrence of an accident because of a peculiar tendency for "accidents to come in bunches." It has been assumed that the cause of accident grouping is that the thoughts of many persons are occupied with the first case and some fail to pay close attention to their own work, thereby falling victims to preoccupation. All concerned can do much to prevent accident repetition by immediately giving full attention to the work at hand. Care should be observed to avoid reference to the accident; every effort should be made to assist everyone to get his mind back to his work and away from the accident.

The Relation of Safety and Production

The discussion of safety first and first aid leads to the outstanding conclusion that safe practices are efficient practices. Safe methods are efficient methods and they are methods which take into account the human factor in all its angles of influence.

The belief that industrial safety and efficiency are closely related has, however, been questioned in some quarters. The accident mortality rate per man hour worked has been increasing since 1920 as shown by the figures reported to the National Council on Compensation Insurance for the compensation insurance cases in thirty-three states. An increased intensity of industrial life has occurred during the same period. This indicated to some observers that one was the natural price, or at least the accompaniment of the other.

Safety and Efficiency Directly Related

The American Engineering Council undertook to answer the question on the basis of fact by making "An Engineering and Statistical Study of the Relationship Between Industrial Safety and Production." The report of this study is based

on data from 13,898 companies in various industries with a total of 2,464,413 employees. These plants or industrial establishments were selected because their records made possible a comparison of accident and production rates in the years 1922 and 1925.

The authors realize that the results shown in this study possibly are better than those for American industry as a whole, because comparisons could be made only in those plants which had records of accidents as well as of production and it is fair to suppose that the companies which have records of accidents are those which are making some attempt to lessen the number. This does not weaken the argument as to the nature of the relation between safety and production.

The following statements are taken from the Report which was published in 1928 under the title, ¹ *Safety and Production*:

“Safety and efficiency are unquestionably linked together by what is best described as ‘continuity of operation.’ For continuity of machine operation—that is, *useful* operation—we must have continuity of feed and stock removal, as well as continuity of power supply.’ . . . The Simmons Company reports, ‘Our experience has been that whenever we made a job safe we also increased the production from 15 to 150 per cent.’ . . . (L. A. DeBlois, *Industrial Safety Organization*. McGraw-Hill).

Safety Work Promotes Industrial Economy

“Before closing, it should be pointed out that it is to be anticipated that the synthesis of results that is to be had from a thoroughly satisfactory solution of organization problems will go further than safety and production. . . .

“The old so-called welfare movement of twenty years ago had a brief and ineffectual career. It passed away because it was not an intrinsic part of industry and because it did not represent any genuine mutuality of interests. The safety movement originated at about the same time. Safety had a genuine and direct interest for both employer and employee;

¹ *Safety and Production*, pp. 11-14, published by Harper & Brothers, 1928.

for the employer, if for no other reason, because accidents under the compensation law formed an element of his cost, and for the employe because it was his own life and limbs that were at stake.

"In order to get results in the safety field, labor and management had to work together. When once working together, however, they became caught by the human quality of the problem and learned to respect and understand each other. In a multitude of cases the safety committees came to be used also for other purposes. In other cases and because of the fact that these committees had been successful, other similar committees were formed to deal with other parts of the problem of working relations. The safety movement, by furnishing a field for a practical working coöperation on the basis of a genuine mutuality of interests, has been perhaps the most important factor in ushering in the era of better industrial relations which exists today."

A Well-Known Safety Program

Since an example of a working program may be helpful, the following is included as typical of a well developed system. The statement was prepared for this publication by C. L. Close, Manager, Bureau of Safety, Sanitation and Welfare, United States Steel Corporation:

"The safety activities of the United States Steel Corporation and its Subsidiary Companies have been based substantially upon three fundamental factors, namely, organization, the correction of physical conditions, and education. The Corporation has expended over \$20,000,000.00 to improve the general physical status of its plants, mines and other operations, and every endeavor has been made to educate the employes in safe methods of performing their work.

"The safety organization of the Corporation, composed of officials and employes, down to the rank and file of the workmen, is both comprehensive and far reaching in its effect. One hundred fifty one trained safety engineers and supervisors devote their entire time to an intensive study of working

conditions and to remedial measures which will prevent accidents. Safety Committees are at work in each Company and plant and in each department of the plants, all working to the same end. Up to the present time over 166,500 employes have served upon these Committees and more than 10,000 men serve regularly.

Organization, Education, and Safeguarding

"The safety educational work has covered a broad field of activity, including timely instruction at the time of employment; monthly departmental safety meetings, attended by the entire department personnel, at which talks are given by foremen, safety supervisors and employes, accidents are reviewed and safe and better working conditions generally are discussed; general safety meetings, rallies and picnics to which employes and their families are invited; safety first poster bulletins and propaganda which reach the employes through the medium of bulletin boards conspicuously placed throughout the plants, safety precepts printed on the back of, or inserted in, pay envelopes or on cards which are freely distributed; safety literature and motion pictures. Competition has been established between Companies, plants and plant departments and the employes are kept fully advised as to their record and standing compared with similar operations. Placing the operations on a competitive basis has done much to stimulate and maintain the coöperative interest of employes in the safety work.

Results of the Program

"The accomplishments of the Corporation and the Subsidiary Companies in the prevention of accidents, viewed from the standpoint of humanity alone, have justified every effort and expenditure. Since 1906 and up to the end of 1927 'Serious and Fatal Accidents' in the operations of all of the Subsidiary Companies of the Corporation were reduced 65.43% and 54,807 men were saved from serious and fatal injury, and since 1912 'Disabling Accidents'—any accident

causing loss of time greater than the balance of the working turn—were reduced 88.19%, which means that a total of 406,408 accidents were prevented and this number of men were saved from injury in these fifteen years.

“In 1922 the Corporation announced that every plant, mine or other complete operating unit which worked a full calendar month without a disabling accident would be credited with a star and that recognition would be given those operations which made this record in a bulletin which would be posted in the plants. That this method of so honoring the plants and operations inspired interest among the employes is evidenced by the fact that 844 stars were credited in 1922, 1,152 in 1923, 1,511 in 1924, 1,753 in 1925, 2,111 in 1926 and 2,418 in 1927. The record for 1927 included 329 operating units involving an average employment of 139,084 men. In these records some of the largest plants and operations of the Subsidiary Companies of the Corporation were represented.

“As an illustration of the efforts that are being exerted by the operations to eliminate accidents it might be cited that the Joliet Steel Works of the Illinois Steel Company with over 2,500 employes, operated 256 consecutive days without a single disabling accident; the Edgar Thomson Steel Works of the Carnegie Steel Company with 6,000 employes went 69 consecutive days and the entire Universal Portland Cement Company with 3,600 men went two full consecutive months in which no men were injured. Other records too numerous to mention also have been made by other plants, some of them operating more than a year without disabling injuries to any of their employes.

“These figures give some indication of what has been accomplished physically in the way of accident prevention by the Corporation. While it is impossible to estimate in figures the psychological value of safety work there is no question of the effect on the morale of the personnel. The good results attending our efforts in the prevention of accidents may be attributed beyond question to the interest

maintained by the employes in all branches of the industry, from the highest officials to the rank and file of the workers. Safety work, while undertaken by the Corporation partly through humanitarian motives, is now recognized as a business proposition of enormous practical and economic value."

INTEREST QUESTIONS

1. Give an instance of an accident due to underestimation of danger; to unconcern for surroundings.
2. Why is the hazard greater for the "green" worker?
3. If you were in charge of a particularly hazardous job, what time of day would you be most careful? Why?
4. Why do provisions for cleanliness and order have a part in a safety first plan?
5. Why is it considered uneconomical for workers to have foreign bodies removed from their eyes by fellow workers? Who should perform the operation?
6. Does the slight difference in estimates of economic loss given by two authorities quoted in this chapter weaken or strengthen the argument concerning the economic necessity for attention to accident prevention? Why?
7. Why is handwork less safe than machine work?

READING REFERENCES

1. American Engineering Council. Waste in Industry, "Industrial accidents," chapter XIV; "Eye conservation," chapter XVI.
2. Cowdrick, E. S. Manpower in Industry, "Guarding the health of the worker," chapter XXIII; "Some specialized functions of industrial medicine, chapter XXIV; "Accident prevention and workmen's compensation," chapter XXV.

CHAPTER XXVI

Relative Risks and Responsibilities of Employers and Employees

Stocks and Bonds; Wages and Salaries

While chance does not govern industrial situations, we have observed that there are situations into which it must always enter. There are hazards of industry which are not subjects for safety first programs. These are shared by owners, managers, and workers. Every such hazard is matched by an opportunity. Reference is made to the relative risks and opportunities of owners, managers, and workers with regard to dividends, salaries, and wages. These are worthy of consideration by those who are interested in this study.

We have observed elsewhere that the employe who has a steady job at fair wages assumes no financial risk in case the business fails to make a profit. At the time this is being written, a report of operations of the New York Stock Exchange (for one day) revealed the fact that 277 of a total of 878 listed stocks do not pay dividends—about 30 per cent. If we study the stock reports in the average daily newspaper at any time, we shall find many stocks listed as non-dividend paying. Even bonds, which are in effect mortgages on presumably good security, may become much depressed in price or even worthless through inability of the organization to meet its financial obligations. Furthermore, wages come first, not only in preference to first mortgage bonds and common stocks but also to preferred stocks. In other words, it is entirely possible that businesses may operate and pay wages and salaries and yet fail to pay any dividends on any part of the invested capital. Closer inspection of stock reports will reveal the fact also that many well-known companies pay an astonishingly low rate of interest on investment. Meanwhile, wages and salaries go on. In addition to this

fact, stock of certain kinds may be assessed when necessary to secure money for expenditures or improvements. It is thus seen that when the position of the wage earner who has steady employment is compared with the man who puts his money in a business, the employe has some advantages. He at least assumes practically no financial risk.

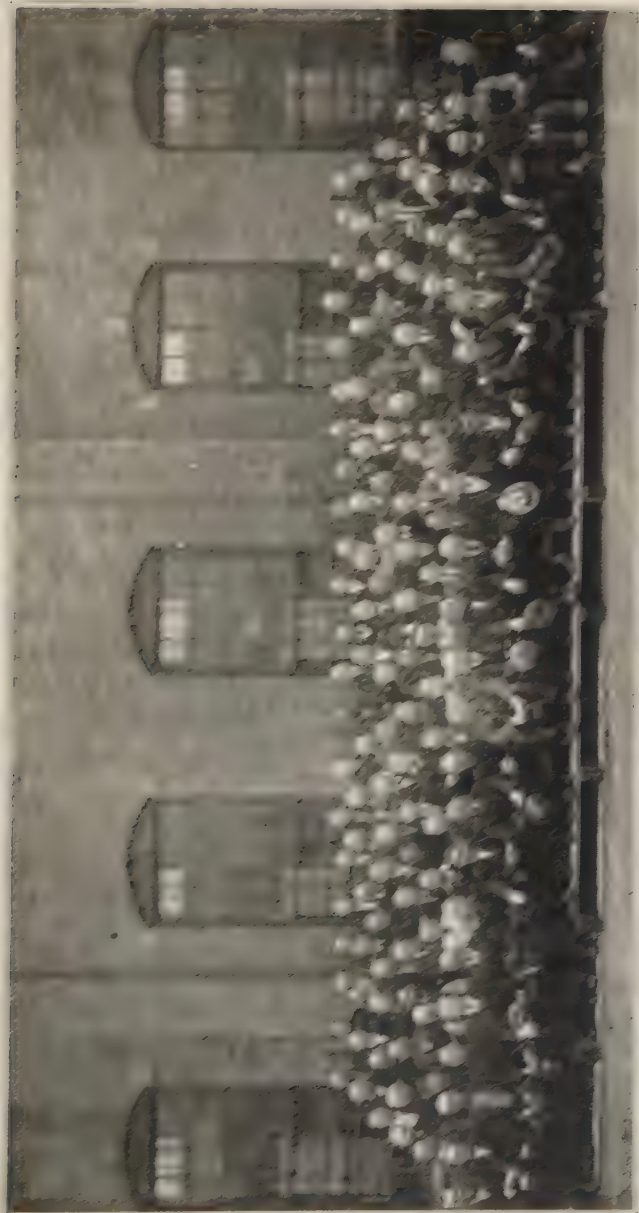
Mutual Interest Requires Understanding

These reflections regarding relative financial risk of owners and employes were not recorded for the purpose of convincing the employe that his position is more desirable than that of the owner or stockholder. Such an attempt would be a ridiculous waste of time and energy. These are simple facts on one side of the question and will be understood as having a very definite relationship to any program which anticipates a feeling of mutual interest in production. If the relationships between wage earners and owners and managers are to take upon themselves any of the desirable features of partnership, the partners should understand first of all their relative obligations as to acceptance of risks and expectations of return.

It should be understood that while ownership offers possible opportunities for large gain, it also carries with it certain financial obligations. Owners and employes both may lose financially, owners through decreased income on investment and employes through decreased wages or unsteady employment. Each represents actual loss. Upon the other hand, the wage earner is fully protected by law against loss of wages as long as he has a job. If the business is unprofitable, the law and long established practice continue to guarantee his wages or salary. It is well, therefore, to compare what each brings to industry.

What the Owner Brings to Industry

Let us see what the owner of a profitable business is really paid for and what the owner of an unprofitable business loses. At first glance, we see the investment. If we are quite



A group of workmen, persistent subscribers to United States Steel Stock, their estimated holdings being worth \$852,500 00.

The picture represents approximately 10% of the total number of subscribers at this Works

Courtesy of National Tube Company, National Works, McKeesport, Pennsylvania

liberal minded, we visualize some one, possibly a business man or even perhaps a workingman, who by saving or business management or other means has accumulated a sum of money.

If he has earned the money by his labor, it represents a surplus which he has gained by spending less than he received. It may represent long periods of self-control and careful planning for deferred satisfaction. With this accumulated surplus, he may have bought a controlling interest or a partnership or perhaps he has bought stock upon the open market. At any rate, he is an owner and we say that he has invested his money in the business. It is usually the money we visualize. We do not always see the man. If we could only see the man behind the money we would see much more than money. Along with the money, the man gave that which is the most precious possession of any man. He placed his faith in the hands of the men who manage the business; and if the investor is a person of industrial experience, he will realize that he is placing his faith in the hands of not only the manager who manages from the office, but also in the hands of the workers who manage as they work regardless of the nature of their jobs. No greater mistake can be made than to assume that business is conducted with money alone. Behind every dollar is somebody's faith in other men and somebody's "nest egg for a rainy day," somebody's provision for old age. The investing of money links the investor's efforts in the past with his faith in the future efforts of others.

What the Worker Brings

Let us turn for a while and look across the industrial fissure to see what the worker brings to industry. We have looked at the owner's and manager's side of the industrial organization fairly closely. What of the wage earner? What does he give in exchange for wages? Here comes a man into the employment office looking for work. He asks if there is a job for him to do. Let us assume that he is given employment. He is told to report to a certain foreman in a certain depart-

ment tomorrow morning at seven-thirty o'clock. This he does and is assigned to certain work. His job is to perform a few operations which with other operations performed by other men complete an article of commerce. What is it he brings to his job? Is it merely his hands? Or perchance, the two feet he walks upon? Or two eyes to see just how to do his work? Or ears to hear instructions and a voice to speak the language of the shop? If these were all, a worker would indeed be merely a self-propelling mechanism. "Men as machines" we sometimes hear them called. Nothing could be further from the truth.

Men Should not Be Considered as Machines

Men can never be considered rightly as machines any more than machines, however automatic, may be considered as men. Such consideration is mere idle speculation. A man is a man and a machine is a machine. A machine may have mechanical fingers. It may have the power of locomotion. A machine may be made to record speech and, surpassing man, may speak again in tones of men long dead, but it is still a machine however well it performs.

All Men Have Responsibilities and Obligations

Beside that man who asked for work stood those he loved. This fact is in nowise discounted by the possible indifference of the man after the job is secured. The fact remains that the man's family is one of his responsibilities, and our responsibilities should be recognized. Our obligations follow us like our shadows, and obligations are the things we owe whether the debt is financial or the more common ones like the debt of love to mothers, gratitude to those who are helpful, and similar indebtedness of other than financial nature. Responsibilities are the debts or obligations we recognize and assume. We all know how we feel about people who deliberately refuse to pay their honest financial debts. We may be assured that the average man who applies for work has some one whom he

knows will expect him to make good. This responsibility is with him. Emerson has well said:

“Really, all things and persons are related to us, but according to our nature, they act on us not at once, but in succession, and we are made aware of their presence one at a time. All persons, all things which we have known, are here present, and many more than we see; the world is full. As the ancient said, the world is a plenum or solid; and if we saw all things that really surround us, we should be imprisoned and unable to move.”

Industry and Race Experience

But this is not all the man brings with him to the job. Every human being inherits his share of race experience. One of our common benefactors is that unknown man or woman who centuries ago first caught a tiny flame from the spark which fell from the stone into the dry grass. We owe a tremendous debt of gratitude to the one who first used fire. We owe another debt to the one who invented the continuous lever or wheel upon which all of our modern civilization is based. His name is lost in the shifting sands of centuries, but his contribution to our progress and happiness remains. We are obliged to him. If we have a sense of honor regarding honest debts, we will have a feeling of responsibility to carry forward in only a little way the race advancement inherited from the past. And so beside the man who asks for work stands all the race experience, the cultural and scientific progress which he may have shared.

The part of race experience which the worker has shared and which he brings to this partnership may represent as long continued effort and self-control as is represented by the money of the owner. All the work he has done understandingly and skillfully, the studies he can or will apply, enable him to contribute more fully to this new partnership.

This partnership in the production and delivery of economic goods has been the dream of industrial ages. Bitter struggles have marked the development of this ideal. It has had its

stages of rapid progress and its periods of retrogression. Of all these phases of industrial change, none is more interesting than that known to economists under the broad term of the Industrial Revolution. Interesting as is this period, it is overshadowed by that all-important process of Industrial Evolution of which the Industrial Revolution may be said to have been a part.

INTEREST QUESTIONS

1. What is meant by a non-dividend paying stock?
2. What is the difference between (a) bonds, (b) preferred stock, and (c) common stock? (See reference No. 5).
3. Is the bondholder an owner of the business whose bonds he owns?
4. Does the bondholder share directly in the management of a business? Explain.
5. What are the principal causes of financial losses in an industrial enterprise?
6. What is the chief concern of the thoughtful worker when seeking employment? the average worker?
7. Which of the following persons is in position to most seriously affect the welfare of a business: (1) bondholder or (2) worker? Why?
8. Is it possible that some bondholders and owners may feel that the worker is quite favorably situated with reference to freedom from financial risk? Explain.
9. Study a recent stock report in a daily newspaper and check several nationally known companies which at present do not pay dividends on either preferred or common stock.
10. What is good will as it is understood in business? Does good will have financial value? Explain.
11. If every worker in a large factory displayed a high degree of good will toward the business, what would be the probable effect upon the value of its stock and stabilization of employment?

12. What is the difference between an obligation and a responsibility?
13. May an irresponsible person have obligations? Explain.
14. What are the obligations of a manager to the owner? to the bondholder? to the worker?
15. What are the obligations of a worker to the manager? to the owner? to the bondholder?
16. What are the obligations of owners to managers? to workers? to bondholders?
17. Give examples wherein, in your opinion, managers might not fully discharge their obligations to owners.
18. What is the difference between recognizing an obligation and assuming it?

READING REFERENCES

1. Brookings, Robert S. Industrial Ownership, "The growth in consumers' ownership of certain public utilities," Appendix I.
2. Dewey, John. Human Nature and Conduct, "Morals are human," part four, section II.
3. Dorsey, George A. Why We Behave Like Human Beings, "From the standpoint of the newer psychology," pages 452-455.
4. Johnson, Joseph French. We and Our Work, "On making our savings work," chapter XVIII.
5. Lapp, John A. Economics and the Community, "Savings and investment," chapter XIII.
6. Robinson, James Harvey. The Mind in the Making, "Three disappointed methods of reform," pages 14-29.
7. Selekman, Ben M. and Van Kleeck, Mary. Employes' Representation in Coal Mines, "Foreward" by Mary Van Kleeck, pages iii-v.
8. Shaw Company, A. W. Handling Men, "There's a solution for labor troubles," an interview with John D. Rockefeller, Jr., by Samuel Crowther.

Relative Risks and Responsibilities

9. Slosson, Edwin E. Sermons of a Chemist, "The uses of adversity," pages 137-141.
10. Taussig, F. W. Principles of Economics, vol. II, revised edition, "The nature and definition of capital," chapter 46.
11. Taylor, F. W. Shop Management, pages 184-186.
12. Watson, John B. Psychology from the Standpoint of a Behaviorist, "Common-sense procedure in securing the control of behavior," pages 3-4.

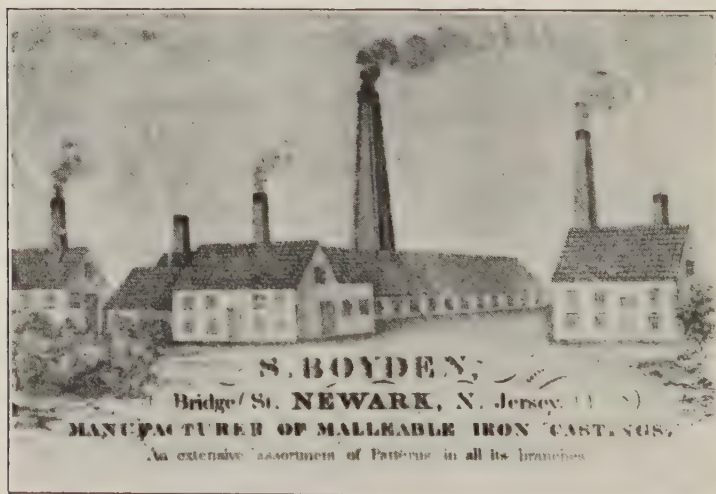
CHAPTER XXVII

Revolution and Evolution in Industry

The Industrial Revolution

Frequent mention is made of "the industrial revolution" in books dealing in various ways with economic problems. Texts on economics and on industrial history treat this period whether they are intended for students in colleges and schools or for men in industry.

Cowdrick in *Manpower in Industry*, discusses this period under the caption, "The rise of the Anglo-Saxon working class." Shearman in *Practical Economics*, describes this industrial change in the chapter on "The two important functions performed by capital in modern production."



Where malleable iron was invented in 1831.
Courtesy of Barlow Foundry, Inc., Newark, New Jersey.

The industrial revolution described by many authors practically upset industry as a result of epoch-making inventions of labor-saving machines. Labor-saving equipment was

introduced into industry which had been operated upon a handwork basis. Thus, the foundry business was practically revolutionized by the introduction of molding machinery. A notable instance of revolution in production as a result of the introduction of labor-saving equipment took place in the glass making industry where machines generally replaced men who were formerly considered indispensable because of special skill.

Evolution Is from Within

Evolution receives its impetus from the inside while revolution is a result of power being exerted from the outside. We speak of revolution in government and in methods of production and distribution, but we refer to the unfolding of human character as the evolution of certain individuals. We speak of the war for American independence as the Revolutionary War because those who waged it put themselves outside British authority by endeavoring to establish a new government in place of the old.

If the southern states had been successful in the Civil War of 1860-65, this conflict would probably be referred to in the South as a revolutionary war. Here is an unusual case in which a civil war resulted in such remarkable changes as to compel a complete reorganization of many of our institutions, yet it was evolutionary in character. Historians are quite correct in not referring to this period of tremendous change as a revolution in social, political, and economic life. The freedom of the negro slaves brought about a development from within. The evolutionary process which followed the issuance of the Emancipation Proclamation continued to be felt throughout America for many years. In fact, the effect of this process is still experienced in our social, political, and economic consciousness.

Ordinarily there would be very little to gain from a discussion of whether or not an economic change should be termed revolutionary or evolutionary, but the past ten years have brought so many claims to economic revolution in Europe

that a clear understanding seems to be required. Professor Carver, in the introduction to *The Present Economic Revolution in the United States*, says:

¹ "The Great War produced a number of political revolutions in Europe. It has not yet produced an economic revolution. A number of old governments have been overthrown and new ones set up in their places. In some cases this resulted in a temporary economic debacle, but wherever industry has begun to function again it looks so much like that which existed before the revolution as to be difficult to distinguish from it. No significant improvement over the old forms of industry has yet been produced in any European country by any of these political revolutions. Their ultimate economic effects go no deeper than those that follow the ousting of one gang of politicians from the government of an American city and the substitution of another."

Few Political Revolutions Are Economic

Professor Carver's next statement is even more pointed—

"An economic revolution may follow as a result of a political revolution, but usually it does not."

These reflections upon the economic achievements of political revolutions are especially to the point in view of the fact that most political revolutions are brought about in an attempt to correct economic ills. We remember that the American revolution was a direct result of the laws which made it practically impossible for the American colonists to manufacture things for their own use and which compelled them to buy British-made goods.

In the light of achievement, the promises of the leaders of recent European revolutions make tragic reading. It would seem that one of the obligations of leadership in times of political revolution should be to assure economic progress. Politicians have failed to recognize the economic significance of change whether that change be in political or economic institutions. Furthermore they have failed to recognize that

¹ *The Present Economic Revolution in the United States*, p. 8.

change is an inevitable condition of every progressive society. Hence, we have the periods of economic debacle to which Professor Carver refers.

Economic Revolutions, Debatable

While there is likely to be some debate as to whether or not there has come about a condition of affairs in the United States which is deserving of being termed an economic revolution, we are certainly justified in referring to our remarkable development of industrial methods and practices as an evolutionary process. It is only in the sense that the great inventions of James Watt, Arkwright, and others, apparently turned things upside down in the industry of their time that we are disposed to term the period the Industrial Revolution.

There have been several periods in the industrial history of the race to which some persons might attach as much significance as has been attached to the age when machinery first changed our production methods.

Anyone who has counted the teeth in a gear knows that it is necessary to establish some kind of mark in order that one may know when a revolution is complete. In cases of political revolutions, it is generally assumed that a change of methods of government marks the achievement of a revolution. It is probable that some changes in government which have been historically recorded as revolutions in reality have been merely changes of governors. Economics, which is of necessity international, is immeasurably greater than political government for it is founded upon mass interests rather than upon the will of classes or even of majorities.

It is easy to announce an economic revolution but difficult to prove the case. On the other hand, evolution is an established fact in every phase of economic life. One can no more start an evolution than one can start a blizzard or a tropical tornado.

Improved Methods Should Be the Aim of All

One great advantage of evolutionary processes over revolutionary programs in connection with economics is that evo-

lutionary processes are always progressive. They always result in improvement. But when people start out to achieve an economic revolution, they are likely to get into a political quagmire from which political independence may or may not be achieved.

Industrial evolution is possible as long as human beings are capable of evolution. Every improvement in methods of manufacture is evolutionary. Every time we shorten the line from the starting point to the goal of production, we are aiding in the great industrial evolution which began with the first crude operations and has continued to the present time. The perennial fruit of evolution is progress—and coöperation is its watchword. To the extent that we coöperate in the production and distribution of economic goods, we are agents of economic evolution.

One other characteristic of evolution is significant. We never speak of an evolutionary period as being "*the economic evolution*" definitely limited as to time. We speak of the French Revolution, meaning the political revolution which took place in France. In the same way we speak of the English Revolution, the German Revolution, the American Revolution, and the Russian Revolution. Revolutions may be assigned dates in history. On the other hand, we speak of evolution as of a continuous progress without beginning and without end. Evolution is a never-ending process of unfolding whose motive power originates within. It is the vital principle in all development beyond which there is only speculation. Economic evolution looks toward the future and those who assist in economic development stand in the center of an ever-widening horizon of opportunity which embraces all of human good.

INTEREST QUESTIONS

1. In your opinion, which of the following achievements had the greatest influence upon industrial progress: (a) Use of fire, (b) invention of the continuous lever or

- wheel, (c) invention of the steam engine, (d) the power loom, (e) the steamboat, (f) the printing press, (g) the sewing machine, (h) the telephone, (i) cast iron, (j) steel, (k) aluminum, (l) airplane, (m) internal combustion engine, (n) the use of electricity?
2. How would you proceed to judge the relative contribution to industrial progress of the writers of books and the builders of machinery?
 3. Compare the service to industry of the following men: Isaac Newton, James Watt, Henry Ford, and Thomas A. Edison.
 4. What were some economic improvements which were the direct result of the American Revolutionary War?
 5. What economic improvements were a direct result of the World War? Is it possible that these might have resulted if the World War had not occurred?
 6. Why do some persons credit the cotton gin with contributing to the American Civil War?
 7. Is a political revolution justified which does not result in economic improvement? Explain.
 8. Name three ways by which any individual in industry may promote economic evolution.
 9. What part does coöperation in production play in economic evolution?
 10. How may the average workman contribute to economic evolution?

READING REFERENCES

1. Burch, Henry Reed, and, Patterson, S. Howard. Problems of American Democracy, "Social evolution," (Early group life) chapter IV.
2. Carver, Thomas Nixon. The Present Economic Revolution in the United States, "Introductory," chapter one.
3. Chase, Stuart. The Tragedy of Waste, "Human wants," chapter IV.
4. Emerson, Harrington. Efficiency, fourth edition, "National efficiencies; their tendencies and influence," chapter II.

5. Hughes, R. O. Economic Civics, pages 109-116.
6. Lewisohn, Sam A. The New Leadership in Industry, "Harmonizing unionism and industrial effectiveness," chapter VII.
7. Shearman, Henry P. Practical Economics, "The well-informed mind," page 49.
8. Slosson, Edwin E. Sermons of a Chemist, "Faith," pages 82-93.
9. Taussig, F. W. Principles of Economics, vol. II, revised edition, "Socialism," chapters 64-65.

CHAPTER XXVIII

Spiritual Values and Business Methods in Industry—The Industrial Earthquake

The Influence of Specialization

The influence of the Industrial Revolution which began with the invention of the steam engine and the spinning jenny extends even to our own time. It has resulted in tremendous changes in social and economic structures among which none is more significant than the breaking up of the former general vocations or "trades" into many specialized occupations.

In the midst of the transition from a few trades in many small owner-managed businesses to many trades in larger units, the automobile was invented. In itself, this was a noteworthy event, but there was to grow out of the automobile industry a new system of production which was to multiply the labor-saving methods some persons had considered illogical.

Where trades had before been broken down into a dozen specialized occupations, the automobile industry in turn broke these specialized occupations down into many different operations each assigned to a worker. The man who for three years "put in bolt 95" replaced the all-round mechanic just as the mechanic had formerly replaced the "jack of all trades." More use of tools, standardization and improvement in measurement were both causes and effects in this continuous evolution.

The Automobile and Industry

This change was hastened because one automobile manufacturer ignored what had previously been considered the very foundation stone of business economy. This manufacturer was formerly a mechanic, and his primary interest was in making a car which could be manufactured reasonably enough to be sold to the average citizen. He proceeded to organize his production so as to turn cars out in constantly increasing

quantities. He believed in his product and believed in the ability of Americans to buy it. Furthermore, he introduced new and unheard of methods of salesmanship and advertising. Other automobile manufacturers saw the opportunity at practically the same time and almost over night a new industry involving billions of dollars and employing hundreds of thousands of men was born.

Specialization and Capital

The extensive employment of men in any modern industry can come only after the extensive equipment of plants with machinery. This requires the investment of huge sums of money. In fact, in some industries, such as the beet sugar, no finished product can be turned out until a million dollars or more has been used for the plant and equipment necessary to carry through the complex process of manufacture.

Capital Defined

In view of the fact that extensive opportunities for employment under modern conditions are generally admitted by all to be desirable, a serious lack of understanding is indicated in the all too frequent articles and speeches today decrying the influence of capital upon human welfare. The authors of these criticisms fail to understand the relation between *capital* in the form of machinery, tools, buildings, steamships, and steam shovels, and *capital* as it is popularly supposed to consist of ready money. Most persons would not speak of a monkey wrench in the hands of a mechanic as so much capital, but in reality it is more truly capital than the money with which it was purchased.

Thomas Nixon Carver, under the heading, "What capitalism is and does," in *The Present Economic Revolution in the United States*, says:

¹ "The Russian Communists are now clamoring for capital and trying to borrow it from the outside world. Even the expedient of issuing unlimited money does not supply capital

¹ *The Present Economic Revolution in the United States*, pp. 227-229.

for the very simple and obvious reason that money is not capital. Capital consists of tools, machines, buildings and everything else of a material nature used in production except land. Money is only a means of purchasing such things. When the money you issue will not purchase them it does you no good.

Capital and Labor

"If labor produces all wealth, Russia ought to be rich. She has plenty of labor. But she now realizes that she needs capital also. There are only two ways of getting it. One is to accumulate it and the other is to borrow it. . . .

"If she can borrow capital at once and equip her industries with machinery and all that is needed, then her industries will be much more productive than they now are. . . .

"In the efforts of the Russian government to borrow capital in this country, their agents make use of some very sound economic arguments. . . . We are reminded that it is very much better to invest capital in Russia so as to give jobs to Russians than it is to give them charity. This is undoubtedly a sound argument. It is a pity that it is not convincing both to themselves and all others who oppose capitalism. The reason it is not convincing is that it is so directly contrary to the whole theory and practice of communism. In order to help the Russian laborer to help himself, the government is compelled to deny communism and to accept capitalism completely, or without any material qualification.

"What capitalism does is to equip laborers with tools, machines, buildings, raw materials and whatever else is necessary for efficient production. Before the days of mechanical inventions, when tools were simple and inexpensive, it did not take much capital to equip a given number of laborers. Now it takes a very large quantity. That is the only essential change which has taken place in the nature of capitalism."

Spiritual Foundations for Installing Capital

Mr. Roger W. Babson, speaking on "Spiritual values in industry" during the Industrial Conference on Human Rela-

tions in Industry, conducted under the auspices of the Young Men's Christian Association at Silver Bay, N. Y., September 1-4, 1921, probed very deeply into the fundamentals of national wealth. Mr. Babson is not content to examine capital with reference to its influence upon the economic life of the community, but he points to the well-known virtues as a source of all economic progress.



An apprentice class at the Frick plant, Waynesboro, Pennsylvania. Many industries maintain classes in which employes may continue their schooling.
Courtesy of Frick Company.

“When industry started in this country, we built a foundation for a two-story building. We have been adding additional stories to this building until we have an eight or ten-story building with the same spiritual foundation. The great task before industry today is to quit adding more stories to the structure and to strengthen the spiritual foundation underlying that structure, without which foundation there could be no structure at all. This is not mere theory; it is very evident in all lines of work. Take any industry for instance. What is the most important asset—the physical property or the management? Any banker will tell you that it is the management. What is the most important asset to a corporation from a business point of view—a great mass of buildings, or a God-fearing board of directors? The answer is obvious.

Spiritual Values and Business Methods in Industry

"I am speaking as a statistician—not as a preacher. If I have learned any one thing during the past twenty years, it is that we owe everything helpful we have got, our political freedom, our personal safety, our educational system, our work to relieve suffering, our industry and commerce, everything that is worth while to civilization, we owe to those spiritual qualities which teach men to serve."

Spiritual Values and Standards of Living

Spiritual values are hard to identify simply because we have been thinking in terms of materialism. Spiritual values enter into every phase of life. They are reflected in our improved tastes which in turn are reflected in higher standards of living.

If anyone had asked our great-grandfathers if there might come a time when nearly every man would possess two suits of clothes and when silk would become a common dress goods for women, he would probably have received an expression of doubt. But economical production involving technical efficiency and the will to work upon the part of industrialists of whatever rank assisted by advertising and salesmanship has raised the standards of living a thousandfold and increased the wealth of our nation beyond the dreams of our great-grandfathers.

The Spiritual Value of Industrial Peace

In the midst of this amazing industrial system, we find ourselves faced with the same major problems encountered by industrialists at the beginning of the specialization period, though less clearly seen at that time. It was as if a great industrial earthquake left a gap between the owners and managers on one hand and the workers on the other.

In typical American fashion of thirty years ago, all manner of emergency structures have been used to bridge the gap. Personnel departments, employe representation, profit sharing, under an even greater variety of names, have been attempted. Their purposes are always the same—that is, to

bring owners and their representatives, called managers, into closer industrial relationships, to increase coöperation in production, and insure the greatest measure of economy for all concerned.

Industrial Success Accompanies Human Interest

It should be borne in mind that with all these emergency measures, there has never been a hint of any general desire to return to the pre-specialization period of small-scale practices, slipshod methods, and handwork. The old world experiment of attempting to revive handwork as a means to joy in production has never appealed to Americans. American workers seem to prefer their satisfaction in automobiles, radios, and other products of machine production; and the owners and managers have looked forward to the development of personnel work as a solution of problems arising from an innate desire for social expression. Those industries which have been most active in personnel work and similar enterprises are distinguished for their progressive manufacturing methods. They usually lead in the installation of labor-saving equipment, in the control of materials and costs, training of employes, and in all manner of human betterment programs.

Varying Industries Complicate Industrial Policy

The industrial fissure which rends the industrial field is of varying width, and there yet will be found manufacturing plants in which this separation has not occurred. There are small shops where the owner continues to work with the men or manages from the office. His title of president, secretary-treasurer, or general manager does not alter his status. The important thing is that he has a large share in the ownership and that he works on the job, knows the men, and is personally known by them.

Sometimes these owner-managed businesses have been exceedingly progressive in matters of materials and equipment control and in control of costs. In such cases, the business is usually highly successful, especially so if the owners are

sufficiently alert to take full advantage of their personal contact and make the most of their industrial relationships.

There are many of these small owner-managed businesses in America and their great number tremendously affects the industrial situation. If they pursue progressive policies of materials, equipment, and cost control, and assume their part in training personnel, they earn the esteem of associating business contacts and share in industrial progress.

Progressive Manufacturing Methods, Fundamental

Mr. Morris Llewellyn Cooke, in his study of "The men's ready-made clothing industry," which is part of the larger study, *Waste in Industry*, says of practices in that industry at the time the investigation was made (1921):

¹ "In fact, there is frequently no available measure of the efficiency of methods other than costs. An accurate cost-keeping system is especially valuable to establishments operating more than one plant, in that it makes analytical comparison of results possible. A cost-keeping system permitting the elimination of guesses and approximations will be a strong incentive in securing the interest of the workers in production. The moment cost-keeping is adopted, many present practices will be discarded. In more than one New York shop the payroll is regularly made up on wrapping paper and consigned to the waste basket after pay day."

Mr. Sanford E. Thompson's study of "The boot and shoe industry" included in the same report reveals the same need for business methods:

² "Scarcely two factories have the same method of keeping costs and few of them maintain sufficient records to give the proper information for assisting in production. There is a need for unification of methods."

Mr. Fred J. Miller, assisted by Mr. William B. Ferguson, made the study of "The metal trades industry." These engineers say:

¹ *Waste in Industry*, p. 112; ² p. 153.

¹ "A small work shop may be very efficiently conducted if it happens that the owner of it 'runs it' and if he is naturally a good manager or executive. Such a man personally knows all his employes, spends most of his time with them, teaching, leading and helping them in all their work. He may easily know the capacities and limitations peculiar to each employe. His treatment of them will be such as to reduce 'labor turn-over' to a negligible quantity and the number of new men employed will be so small that he can, with comparative ease, get good men when he wants them; all his contented and loyal employes become his agents in securing additional help when wanted. The movement of materials from place to place as needed and the planning of operations in proper sequence are easily accomplished by such a man under such conditions.

Management Means Leadership

"Beyond a certain magnitude one-man management obviously becomes impossible, and management functions must be delegated to others who must be carefully selected and trained and whose activities must be thoroughly coördinated and harmonized. It is the task of the modern industrial leader to delegate the management functions and the problems of human nature, to which many of our industrial difficulties are traceable, to subordinate executives, and to supply them with the means for solving these problems. Failure to make such provision must be considered as incompetent management. There is probably a direct connection between the increase in size of industrial plants, and the statement made by 'Bradstreet' to the effect that, while 'incompetence' had always bulked large as a cause of business failures, by 1912 it had grown to be the chief cause and by 1919, 38.2% of all failures were caused by it. During this period, plants were rapidly increasing in size because of the growth of the country and a higher standard of management was at the same time being required."

¹ Waste in Industry, p. 221.

How to Be "Lucky"

Mr. Sanford E. Thompson's study of "The building industry," contains the following statement:

¹ "As indicating what can be done, we have in mind a contractor—not representative of the class as a whole, we regret to say—who after making a thorough study of conditions as to both the material market and the site, draws up in conjunction with the engineer and the man who is to handle the work in the field, a detailed progress schedule on which all future operations are to be based. . . . The schedule is checked daily and lived up to. On the basis of this progress schedule a material schedule is drawn up on which is indicated dates the various quantities should be taken off, dates to order materials, outside shipping dates, and dates on which the various materials should be delivered to the job. The purchasing department has a follow-up, which functions to assure all concerned that the dates in this schedule are maintained. The field superintendent is kept in touch with all items by ticklers containing latest information as to shipment, etc., which must be returned immediately upon receipt with notations as to record of shipment and receipt of material; thus all functions are coördinated and rarely is a job delayed or held up for want of materials.

'The effectiveness of this method was fully demonstrated during the past four years when the demand for material was unprecedented. This contractor was spoken of as being 'lucky' and 'fortunate' because jobs went along with normal and even, at times, abnormal speed, whereas the well-balanced condition was due wholly to thorough planning.'

To the extent that these progressive business and manufacturing measures are neglected, any industrial organization becomes a menace to every other. As has been pointed out elsewhere in this series, the company which does not maintain an active interest in rate making and cost accounting is an unsafe company to work for and it is equally true that a firm

¹ Waste in Industry, pp. 72-73.



Student apprentices at Allis-Chalmers' plant, Milwaukee, Wisconsin. Apprenticeship and education are synonymous in many industries. Courtesy of Allis-Chalmers Manufacturing Company.

which does not do its utmost to improve production through labor-saving devices while maintaining standards of quality is apt to be an unstable place of employment.

While, from the standpoint of number, America may be said to be a nation of small shops, it is equally true that in the most specialized and highly developed industries the largest production is carried forward by giant industrial organizations. It is true also that the tendency in America is toward centralization and specialization.

Industrial Relations Require Increasing Attention

Thus, we may logically predict a continuance of the rending effect of the thirty-year earthquake with a continuance of the disturbances incident to the original separation of ownership and managership when the first great corporations were organized. These disturbances will necessarily involve the organization of industrial life which is being so rapidly changed. How far they will involve the peace and understanding of the human factor depends on what is done to promote harmonious adjustments.

We may expect a certain type of politician and the demagogue to continue to seize upon these progressive changes in the material conditions of industry as opportunities for popular appeal to less informed workers. All of this is incident to the industrial development of a nation, wherein the small isolated industrial unit is succeeded by the larger organization operating upon a specialized basis with economical measures in control of production and distribution.

Business Methods Must Parallel Production Methods

The industrial upheaval which began with specialization will continue until business methods have progressed as far as have methods of production. It is hard to understand the reasoning of some writers and speakers who charge all the evils of modern social life to business. The fact of the matter is that, as has been previously observed, business is merely a tool by which modern society exchanges products. Right here is where the superficial thinker jumps to another wrong conclusion. He assumes that business begins with the sale of the article and ends with its delivery. Nothing could be more misleading than such a narrow conception. Business enters into every detail of production of economic goods. It begins with the inception of the initial plan to secure material. It enters into every operation of every process.

The production and distribution of economic goods is not suffering from too much business. Too little business is what troubles industry. We need more business in industry rather than a curtailment of business practices in production. Business is not to be blamed for industrial and social unrest. Our difficulties are simply a result of the determined attempts by some to pursue obsolete business tactics in connection with production and distribution. These were none too good under the system of production which preceded the period of specialization. It is as if we should endeavor to live and progress amid the ruins of industrial upheaval instead of clearing away the debris and building anew upon solid foundations.

INTEREST QUESTIONS

1. What would be the probable effect upon prices of automobiles if they were made by hand without the aid of highly specialized methods of production?
2. Name five articles possessed by the average worker which might not be commonly possessed if highly specialized methods were not followed in their production.
3. What is the difference between business and industry?
4. Does production precede or follow demand in its initial stages? Explain.
5. Have salesmanship and advertising equal rights with labor to be considered in the price of a product? Explain.
6. Name a widely known industry wherein handwork still is quite general. Mention industries rather than trades.
7. Name several leading characteristics of progressive industrial organizations.
8. What is meant by specialization being followed by centralization in industry?
9. What is meant by spiritual values in industry? How would you proceed to increase them?
10. Why does industrial progress depend upon business integrity?
11. Suggest ways by which harmonious adjustments may be promoted in industry.
12. What is the best way to counteract the influence of the industrial demagogue?

READING REFERENCES

1. Brookings, Robert S. Industrial Ownership, "The changed relation of labor to industry," chapter VI.
2. Burch, Henry Reed, and, Patterson, S. Howard. Problems of American Democracy, "Modern capitalistic production," chapter XIX.
3. Carver, Thomas Nixon. The Present Economic Revolution in the United States, "What capitalism is and what it does," chapter eight.

Spiritual Values and Business Methods in Industry

4. Chase, Stuart, and, Schlink, F. J. *Your Money's Worth*, "Quack, quack," chapter VII.
5. Cowdrick, E. S. *Manpower in Industry*, "The rise of the Anglo-Saxon working class," chapter II; "The American labor movement," chapter III; "The worker and modern capitalistic production," chapter IV; "The foundations of industrial justice," chapter XII.
6. Johnson, Joseph French. *We and Our Work*, "Large scale production," chapter XIII.
7. Lapp, John A. *Economics and the Community*, pages 138-142.
8. Shearman, Henry P. *Practical Economics*, "The economics of large-scale organization," chapter X.
9. Slosson, Edwin E. *Chats on Science*, "Science gives before she is asked," chapter 72.
10. Slosson, Edwin E. *Sermons of a Chemist*, "The geometry of ethics," pages 200-202.
11. Taussig, F. W. *Principles of Economics*, vol. II, revised edition, "Trade-unions," chapter 55.
12. Tead, Ordway. *Instincts in Industry*, "The instinct of workmanship," chapter IV.
13. Wood, Charles Wesley. *The Myth of the Individual*, chapter XIV.

CHAPTER XXIX

Bridging the Industrial Canyon—Square Dealing versus High-Sounding Phrases—Living Here and Now

Industrial Relations Should Not Depend on Chance

What shall we do to bridge the gulf between owners and managers on one side and workers on the other? This is admittedly the foremost question in the big industrial organizations; and if present tendencies toward specialization and centralization continue, this question will become paramount in every industry. Certainly, we should pursue a policy of replacing emergency structures with permanent ones. Certainly, also, whatever has been demonstrated to be of value should be retained in planning a permanent structure the purpose of which is to unite ownership, management, and distribution in the most generally satisfying and economical manner.

Dr. Henry Van Dyke, in his delightfully wholesome collection of stories published under the title, *Fisherman's Luck*, reflects interestingly upon "The thrilling moment."

¹ "Every moment of life, I suppose, is more or less of a turning-point. Opportunities are swarming around us all the time, thicker than gnats at sundown. We walk through a cloud of chances, and if we were always conscious of them they would worry us almost to death.

"But happily our sense of uncertainty is soothed and cushioned by habit, so that we can live comfortably with it. Only now and then, by way of special excitement, it starts up wide awake. We perceive how delicately our fortune is poised and balanced on the pivot of a single incident. We get a peep at the oscillating needle, and, because we have happened to see it tremble, we call our experience a crisis."

¹ *Fisherman's Luck*, p. 39, published by Charles Scribner's Sons, 1926.

Sincerity Must Be Practiced in Industry

In this thought, voiced by an author whom many have come to trust because of his kindly sincerity, we have a picture of a condition which is as true of industry as of individual life. In fact, life is life wherever we find it. After all, industry is merely a manifestation of life exactly as government and religion are other manifestations. Industry is subject to the same laws of habit formation as any other phase of life, for habits function through the lives of individuals. Selfishness is selfishness wherever we find it. Sincerity is sincerity whether in a cloister or in a machine shop. Fear is just as demoralizing in industry as on a battlefield.

When the whole matter of industrial adjustment is analyzed, it is clear to any reasonable person that most of the difficulties are a result of the over abundance of bad advice. Self-selected leaders confuse industrial questions by finding the little grains of simple truth difficult to accept while swallowing all manner of false teachings concerning industrial questions. Why should we build up elaborate schemes designed to secure coöperation when all that is desired is simple honesty?

Complicated Programs Are Questionable

Industrialists should beware of the man who has a one-sided cure for industrial misunderstandings. Likewise, we should beware of schemes which are too complex for the understanding of the most ordinary person. Great truths are not difficult to understand. It is our own lack of vision that makes them seem difficult. As James Harvey Robinson says in *The Mind in the Making*:

¹ "It is the avowed purpose of scientific thought to reduce the number of mysteries, and its success has been marvelous, but it has by no means done its perfect work as yet. We have carried over far too much of medieval mysticism in our views of man and his duty toward himself and others.

" . . . As yet their (the scientists') type of thinking has not

¹ *The Mind in the Making*, pp. 146-147, published by Harper & Brothers, 1921. Parenthetical statement ours.

been applied on any considerable scale to the solution of social problems."

High-Sounding Phrases Indicate Spiritual Blindness

One of the certain evidences of spiritual blindness of an industrial guide is his development of a high-sounding terminology which leads only to appreciation of words. He speaks of economic determinism, industrial psychosis, the philosophy of repression, and other academic pronouncements as if they carried some magic charm to frighten away the evil spirits of industrial darkness.

Dr. Van Dyke, in his essay on "Talkability," adds his warning against the scholarly person whose fine phrases may conceal a self-centered personality. He says:

² "I knew a man once (I will not name him even with an initial) who was malignant to the core. Learned, industrious, accomplished, he kept all his talents at the service of a perfect genius for hatred. If you crossed his path but once, he would never cease to curse you. The grave might close over you, but he would revile your epitaph and mock at your memory. It was not even necessary that you should do anything to incur his enmity. It was enough to be upright and sincere and successful to waken the wrath of this Shimei. Integrity was an offense to him, and excellence of any kind filled him with spleen. There was no good cause within his horizon that he did not give a bad word to, and no decent man in the community whom he did not try either to use or to abuse. To listen to him or to read what he had written was to learn to think a little worse of every one that he mentioned, and worst of all of him."

Scholarly phrases will not improve industry. Neither will industrial improvement result where ideals are rejected and men try to force issues as though human beings might be sprung into place. The bridge between the old industrial order and the new will not be built of steel and concrete. It will be built of ideas and ideals. It is for exactly this reason that this

² Fisherman's Luck, pp. 74-75.

subject is treated in this series. Ideas and ideals are not the special possession of any man or group of men, and every human being who is in any way concerned with industry must reason upon these new ideals and ideas if they are to be effectively used.

Owners, Managers, and Workers Must Coöperate

No greater mistake can be made than to assign to managers and owners the sole responsibility for progressive industrial relations programs. It is difficult to estimate even the possible percentage of influence of managers and owners upon the success of an industrial relations plan. Certain it is that if managers and owners do not become actively interested, no good will result. On the other hand, if all the owners and managers in America should decide to promote the best industrial relations plan available, the result would be scarcely more than a verbal endorsement if the plan were understood and approved only by owners and managers. No bridge of any consequence was ever bridged from one side of the chasm. It may have its beginning on one side, but in the interest of permanency of structure, a foundation must soon be laid on the other side.

Mutual Confidence, the Only Sure Foundation

Unquestionably, one industrial asset is mutual confidence. This is sometimes spoken of as the result of square dealing. Without this feeling of mutual faith, it is useless to proceed. Right here, let us complete the parallel we have been following by observing that if we are to lay a firm foundation, we must first dig out the muck and level off the rock bottom upon which the foundation is to be laid. We all remember the parable of the two houses—one builded upon the sand and the other upon the solid rock. This parable applies equally well in industrial relations as elsewhere.

Sand is a poor foundation because it has nothing in it to bind the grains together. Mix it with cement and it becomes a "solid rock." Simple truths, like honesty, sincerity, open-mindedness,



The American Rolling Mill Company's interviewing section. Self-respect and mutual confidence are demonstrated in employment departments of progressive companies. Courtesy of The American Rolling Mill Company, Middletown, Ohio.

faith in our fellow-men, truth-telling, square dealing, such as are recognized by every normal human being, make up the cement of human character. These form the solid rock upon which we may erect the structure of industrial coöperation. But we must be careful about gnats and camels. We must be continually on our guard against the false conclusion that industrial understanding can result from profound studies or from material arrangements alone. We are indebted to Basil King for a very clear statement of this idea in his book, *The Conquest of Fear*.

¹ "Our industrial questions are primarily spiritual. That is why they can never be settled on a purely economic basis, and why every attempt to settle them on a purely economic basis leads to conditions more confused than those from which we have emerged."

¹ *The Conquest of Fear*, p. 209, Garden City Publishing Company, 1921.

An Example of Square Dealing

Stewart Edward White, in his gripping story, *Gold*, tells of one of the early sermons delivered in old San Francisco. The moral of the narrative will apply today in industry. By reason of his honesty, sincerity, and all-round square dealing, the preacher had made friends of a number of the rough characters of the mining village, some of whom helped him build his church. All went well as long as he confined his preaching to the utterance of platitudes. The narrator of the story says:

¹ "We liked him so much that we turned to at odd times and helped him with his carpenter work. While thus engaged he confided to us his intention to preach against the gambling the next Sunday in the Plaza. We stopped hammering to consider this

"The news spread abroad, and there was much speculation as to what would happen. In general the sentiment was hostile to the preacher. It was considered an unwarrantable interference with freedom for any man to attempt to dictate the conduct of another. Everybody agreed that religion was all right; but by religion they meant some vague utterance of platitudes. On the appointed Sunday a very large crowd gathered in the Plaza. Nobody knew just what the gamblers intended to do about it. Those competent citizens were as close mouthed as ever. But it was understood that no nonsense was to be permitted, and that this annoying question must be settled at once and fully. As one gambler expressed it:

" 'We'll have these fellows caterwauling all over the place if we don't shut down on them right sharp off quick.'

"Taylor arrived about ten o'clock and proceeded briskly to the pork barrel that had been rolled out to serve as a pulpit. He faced a lowering, hostile mob.

" 'Gentlemen,' said he, 'if some means of communication existed by which the United States could this morning know that street preaching was to be attempted in the streets of San Francisco, the morning papers, badly informed as to

¹ *Gold*, pp. 421-423.

the temper and disposition of the people of this new country, would feel themselves fully justified in predicting riot, if not actual bloodshed. Furthermore, I do not doubt that the greater dailies would hold their forms open to report the tragedy when news of it should come in. But we of the West know better than that. We know ourselves rough and ready, but we know ourselves also to be lovers of fair play. We know that, even though we may not agree with a man, we are willing to afford him a fair hearing. And as for rioting or bloodshed, we can afford to smile rather than become angry at such wide misconception of our decency and sense of fair dealing.'

"Having in this skilful fashion drawn the venom from the fangs of the mob, he went directly ahead at his sermon, hammering boldly on his major thesis. He finished in a respectful silence, closed his Bible with a snap, and strode away through the lane the crowd opened for him."

Square Dealing Is Needed

Just the simple truth set forth dramatically in a story of old California. Fair dealing is the foundation stone upon which we may build with absolute assurance whether we are building a church or an empire; whether we are building a home or a future in human service through industry.

What is the muck and shifting sand which we must remove? It is oddly interesting to note that in the same literature which featured the general use of the terms Capital and Labor, the term muck-raking first appeared. A muck-raker was one who presumably raked over the useless material which concealed the fundamentals. The muck-raker was concerned with destructive ideas rather than constructive ones.

Undoubtedly opposition to that which is wrong has its place in every phase of human activity. But merely to point out error without offering a remedy when every one realizes that something is wrong is confusing. The muck-raker was always pointing out what was the matter and never suggesting a remedy. This naturally led to his seeking the most dis-

agreeable muck in which to operate as it was here that the most undesirable things could be uncovered. Students of the history of the industrial revolution in America will find a combination of humor and drama in the industrial changes which produced at once the muck and the muck-raker.

We Must Go Forward

Mr. Sam A. Lewisohn, under the heading, "The football of our emotions," in *The New Leadership in Industry*, offers a suggestion which is worth considering at this point:

¹ "It may be a healthy thing at times to forget the historical background and see the situation afresh, from a practical point of view. The important problem after all is not so much the 'why?' as it is: 'What conditions exist now?' and 'What are we going to do about it?' Indeed, in meeting any problem it is a more healthy and practical procedure to put aside the past and to attempt to examine the existing situation with an unencumbered mind. In brief, we must look upon the modern problems of industry objectively and try to work out the best form of organization. Those interested in the labor problem have given this aspect of the subject least attention."

Mr. Lewisohn does not suggest that we completely ignore history in considering human relations in industry. The point is rather that we should ignore those details which have no connection with present industrial problems. There are problems at present in industry which to some extent are the direct result of our getting out of step with conditions because industry has moved so rapidly that we have failed to keep pace.

Fruitless Discussion Is Dangerous

While appreciating the value of a knowledge of "the historical background," we must be on our guard against falling into another pitfall which is all too commonly encountered in our survey of the field of human relations in industry.

¹ *The New Leadership in Industry*, p. 21.

This is referred to in an interview with Owen D. Young, Chairman of the Board of Directors of the General Electric Company, as reported in *Forbes Magazine* of December 1, 1927, as follows:

"I have been impressed in the course of my life by the fact that bitterness usually comes from discussing things which are not up for solution, something off in the future. Such theoretical, speculative discussion is waste and much of it is worse than waste because it breeds misunderstanding and ill-will.

Our Main Objective

"If people would do the things which are to be done immediately, and try to do them well, and not bother too much about far off things except to see that we are headed right, mankind would make more actual progress and make it more harmoniously.

"And that after all—harmonious progress towards the betterment and the brotherhood of man—is, or should be, the main objective of us all, whether we work mainly with our heads or our hands, handling mainly capital or handling other tools for the providing of man's wants and the fulfilling of his aspirations."

A Way of Life

This same thought is beautifully expressed in an address entitled "A way of life" by William Osler, to which reference has already been made. Dr. Osler was one of the world's great medical authorities who during his lifetime was honored in many ways as a man of unusual ability. Speaking to students of Yale one Sunday evening, he offered the following advice:

¹ "Now the way of life that I preach is a habit to be acquired gradually by long and steady repetition. It is the practice of living for the day only, and for the day's work, *Life in day-tight compartments*. 'Ah,' I hear you say, 'that is an

¹ *A Way of Life*, pp. 6-7, published by Norman, Remington Company, 1923.

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easy matter, simple as Elisha's advice!' Not as I shall urge it, in words which fail to express the depths of my feelings as to its value. I started life in the best of all environments—in a parsonage, one of nine children. A man who has filled chairs in four universities, has written a successful book, and has been asked to lecture at Yale, is supposed popularly to have brains of special quality. A few of my intimate friends really know the truth about me, as I know it! Mine, in good faith I say it, are of the most mediocre character. But what about those professorships, etc.? Just habit, a way of life, an outcome of the day's work, the vital importance of which I wish to impress upon you with all the force at my command."

"Wherever You Are, Be All There"

This reflection of Dr. Osler's reminds us of the famous reply of Goethe to the student who asked him what he should do in order to succeed. The great scientist and poet said simply: "Wherever you are, be all there."

After all, this is the keynote in the great harmonies of life, whether it be in industry or in any other group of human



Armour and Company's personnel department. The chief aim of personnel departments is to improve industrial relations.
Courtesy of Armour and Company, Chicago.

beings. If we will put ourselves wholeheartedly into anything in the present which is good, only good can result.

The bridge across the canyon of industrial unrest must be constructed of ideals and only those who give full attention to the problems to be solved when they arise can expect their labor to be fruitful.

The earnest conviction of the need for a permanent structure insuring communication between management and workers must be shared by managers and workers if much is to be accomplished. This is fundamental and this alone can assure a vision of the future beyond the muck of dead yesterdays some of which clings to our feet as we prepare the foundations of industrial understanding.

Let us understand that we must rid industry of the muck of discontent and disagreeableness. This cannot be done by stirring up animosities. Since we are dealing with ideas and ideals, we cannot resort to steam shovel methods. Discontent and disagreeableness can be uprooted only by replacing them with an atmosphere of agreeableness. This effort cannot be one-sided.

INTEREST QUESTIONS

1. How does specialization increase problems of industrial relations?
2. What is meant by centralization in industry?
3. What can the average worker do to improve industrial relations which management cannot do?
4. In what way may workers proceed to develop mutual confidence between owners and workers?
5. What, in your opinion, may owners do to develop mutual confidence between workers and managers?
6. What is a square deal between workers? workers and managers?
7. What is capital?
8. What is labor?
9. Are tools, machines, and similar equipment used in production of capital? Explain.

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10. If a machine cost \$1000 and is allowed to remain idle a part of the time, is the capital of the company affected? Explain.
11. Give some examples of destructive ideas which might be advanced in connection with the performance of operations and processes.
12. Give examples of constructive ideas which might be advanced in connection with the improvement of human relations in industry.
13. How does a plan of work or the plan of a life relate to each day's work?
14. How does a well-ordered plan help us to follow Dr. Osler's advice?
15. Under what circumstances are the solution of tomorrow's problems a part of the work of today?
16. What part does faith in men and in future opportunities have in developing a healthy mental attitude in human relationships in industry?

READING REFERENCES

1. Brookings, Robert S. Industrial Ownership, "The compensation of capital," chapter IV.
2. Carver, Thomas Nixon. The Present Economic Revolution in the United States, "Ancestral voices prophesying war," chapter six.
3. Child, Richard Washburn. Battling the Criminal, "Turning back the crime tide," chapter X.
4. Ford, Henry, and, Crowther, Samuel. My Life and Work, "Democracy and industry," chapter XVIII.
5. Hughes, R. O. Economic Civics, "Capital and its importance," pages 125-127.
6. Johnson, Joseph French. We and Our Work, "Income and welfare," chapter VII; "Capital, a partner derived from land and work," "Origin of capital," pages 127-128.
7. Krutch, Joseph Wood. "The modern temper," Atlantic Monthly, February 1927, pages 167-175.
8. Osler, William. A Way of Life.

9. Shearman, Henry P. Practical Economics, "The intellectual processes—observation-memory-imagination," pages 45-46; "Fixed and circulating capital," "The production of capital," pages 68-71.
10. Tead, Ordway. Instincts in Industry, "The instincts of possession, ownership, property, or acquisitiveness," chapter V.

CHAPTER XXX

An Educational Experiment That Pays Dividends— Company Loans to Employees—Friendship and Industrial Education

Foremen's Tools for Industrial Peace

The progressive personnel policies of a well-known manufacturing plant in the middle West have been recognized for years. The point of view in this plant toward familiar personnel activities reflects the newer attitude. Loan plans, cafeterias, pension plans, workmen's insurance, recreational activities, and similar details usually considered as parts of welfare or so-called service work are looked upon as so many different tools to be used by the foremen to assist them in developing improved industrial relations.

Thus, a loan plan is provided whereby the company places at the disposal of its foremen adequate funds to be loaned to employees upon the recommendation of their foremen.

A workman may want to build another room to his dwelling or reshingle the roof, or he may need ready cash for any number of reasons and find it necessary to obtain a loan from some source. These are common occurrences in the experience of nearly everyone. The only unusual thing about the situation we are discussing is found in the willingness of this company to extend the loan upon the recommendation of a foreman. If the loan were not so made, the natural procedure would be for the worker to go to a bank or other money lending agency where he would find it necessary to give reference or security of some kind.

In the case of this company, the loans are made in faith without notes, the security being the previous record of the worker to whom the loan is made. This is where the foreman enters into the procedure. The foreman is recognized as judge of the worker's record in production. This company considers coöperative mental attitudes and ability to get along with fellow workers to be part of a production record.



Annual picnic of The Ohio Brass Company, Mansfield, Ohio. This company has proved that agreeable relationships are reflected in production. Courtesy of The Ohio Brass Company.

Friendship at Work in Industry

Throughout these years, this concern has consciously endeavored to develop upon the part of every person connected with the company a feeling of faith in the company as a friend to everybody in the offices and plants. Friendship has been accepted by company officials as having a direct tangible value in production and delivery. It is not uncommon for ordinary laborers, mechanics, or others to go to their foremen with many of the problems which, under other circumstances, ordinarily find their way to courts.

One example will serve to indicate procedure: An enterprising agent called at the home of an employe during his absence and sold to a member of the household an article of merchandise, taking in exchange a similar article which had been used in the home for several years and was quite satisfactory to those who used it. Without knowledge of the employe, a partial payment contract was signed by a member of the household who was without ability or authority to transact such business. The understanding on the part of this purchaser was that the contract was merely a form permitting the agent to place the new article in the home for trial.

When the employe learned of the contract, he immediately requested the sales agency to return his property and to remove the new article from his residence. This the agency refused to do, pointing out that the former article had been disposed of as secondhand. The agency represented a nationally known manufacturing and sales organization of unquestioned influence.

In his dilemma the worker mentioned the difficulty to his foreman. His production record was good and the foreman presented the case to the personnel superintendent. The result of this interest was that the agency was notified the company's attorneys would represent the employe; and the whole matter was adjusted to the entire satisfaction of the employe.

Paternalism and Friendship Cannot Exist Together

Paternalism is not in evidence in this industrial organization. In fact, every effort is made to show to all concerned that company interest in employes is merely good business procedure. Every foreman understands that in order for workers to give their best efforts to the company, they must be free from worries and petty cares, most of which are capable of adjustment.

"Selling" the Business to the Men

These relationships laid an excellent foundation for an educational program which while begun as an experiment has been continued as a paying proposition. Company officials conceived the idea that if each one in the business knew something about the work of every other one that this knowledge would be useful in production, sales, and delivery. Plant tours were organized under the supervision of the manufacturing superintendent. Five guides were selected who at stated times conducted groups through thirty-five departments. The tours included every department from the general offices through the manufacturing, technical, and printing departments to the power house and shipping room.

Every person in the organization was furnished with a bulletin outlining the purpose of the tours, giving the names of the guides and a brief description of each department to be visited. The bulletin also gave a resume of the history of the company from the time of its organization with twenty men on its payroll in 1888 until the present time. These tours were arranged during the regular working hours, the company paying the usual wages for all who enjoyed these opportunities. Comparatively small groups were formed in order that the guides might answer all questions and fully explain important details. Each guide carefully prepared his descriptions of department details before beginning this work.

Well Planned Shop Meetings Show Results

In addition to the tours, noon hour meetings were organized

in the assembly hall which accommodates several hundred persons. These meetings began at 12:30 P. M. and continued until 1:00 P. M. on Mondays, Tuesdays, Wednesdays, and Thursdays. On Fridays, the time was from 4:00 to 4:30 P. M. This schedule continued for eight successive weeks. Since the regular lunch period was from 12:00 to 12:30 P. M., the company paid the wages of wage earners while attending the noonday meetings. Unlike the plant tours, attendance was voluntary. Anyone who wanted to attend might do so, and the audiences were cross sections of personnel—stenographers from the offices and workmen from the foundry were alike interested in these meetings.

Speakers read carefully prepared lectures to these audiences, each lecturer delivering the same lecture five times to five different audiences in one week. Another lecturer presented a different lecture the following week. These lectures, given by respective leaders in these divisions of the plant, concerned the subjects of "Personnel work," "Developing new devices and technical control of processes," "Problems of manufacturing departments," "Production problems of the factory," "Selling materials to the trade," "Advertising name and products," "Sales engineering problems," and "Cost problems of the factory."

Operations and Processes Made Interesting

The talk given by the manufacturing superintendent traced the various operations necessary to design, produce, sell, and deliver a very simple device. Most of us are apt to think our own part of every job to be the largest part. It is natural for a worker who makes a mold in a foundry, a pattern in a pattern shop, or who does some job in the machine shop to think that he should receive as wages a larger share of the sales price than he is receiving when he learns how much greater the sales price is than the part he receives.

This description of operations related to one small article is worthy of attention, keeping in mind that this company

is known as one in which rigid economy is continually practiced. The size and relative simplicity of the article will be appreciated by observing the small device shown held in the fingers of the hand in the advertisement under the caption "Tested" at the extreme right of the illustration following this page. Every other thing in the display either represents tools or drawings or records necessary in manufacturing the little device shown in the advertisement. The sale price of this article must compensate for more than one hundred different tools or forms and allow a reasonable profit for investors.

The Story of One Small Product

With the permission of the author, F. A. Klohs, The Ohio Brass Company, Mansfield, Ohio, the paper is reproduced as it was given.

"It may be of interest to our people to get an idea of what is necessary in the factory organization to produce some of our materials. The idea I wish to convey is a better understanding of the work of the various members and departments of our organization and the facilities that we have at hand to produce our material.

¹"This display was assembled to convey this thought, and I purposely selected an article that is very simple—so to speak—in its manufacture at our plant.

Starting the Job

"In starting the manufacture of any article, it is necessary, first, to have a design. This is initiated by an engineer through a request from the Sales Department or sometimes from a customer. In any event, it is necessary for the engineer to make a design showing the article. This design is then forwarded to the Manufacturing Division for a cost estimate. The request from the engineer is made on a standard form known as a 'Bill of Requirements' which gives the weight and kind of material to be used and the general characteristics of its manufacture.

¹ See Illustration following this page.

An Educational Experiment that pays Dividends

Details of the Estimate

"The Manufacturing Division in turn uses a form known as the 'Manufacturing Superintendent's Estimate' where all information is recorded regarding the type of pattern needed, its cost, the tools necessary and the cost of same, also the labor required in producing the article.

"This form is then forwarded to the Cost Department for final estimate, where all the information given them is summarized and the necessary overhead or carrying charges are computed. All this is then forwarded to the Sales Department.

From Sales to Production

"When the Sales Department with this information develops an order, it is entered upon the Production Department's records and a memorandum is sent to the Engineering Department advising them of this order. There follows the making of a regular blue print and all detail blueprints necessary for proper transmission of this design or thought to the plant.

"The Production Department immediately gets busy and issues the necessary requisitions for material and orders for the plant. Requests are issued by the Chief Tool Designer to the various manufacturing departments that may be involved in the manufacture of this material, which enable them to requisition the tools necessary in the manufacture of the device.

Patterns and Core Boxes

"The General Foreman of Patterns initiates a request for a pattern, core boxes and dryers that may be involved on this order. The requests for the tools and patterns are received and orders written in the Plant Manager's Office.

"The Tool and Pattern Departments are now ready to proceed with the manufacture of this equipment. Upon completion of this work, a form is used known as our Distribution Sheet that transmits to the Production Department the message that the equipment is ready to be put into regular production. The responsibility of processing the material in

the plant at this point rests with the Production Department, which in turn is in close contact with the requirements of our customers through the Sales Department.

"It may be interesting to know what the detailed procedure is in the development of an aluminum plate pattern shown in this display. The pattern maker starts by making a wood master with a double shrink allowance which is necessary on account of using a metal master for producing the final aluminum plate.

Foundry Work, a Long Process

"In order to make the metal master pattern, it is necessary to construct a lightening core box which is of great advantage to the master plate molder as it relieves the metal master pattern of considerable weight. It is necessary to make patterns for the core boxes; and the method pursued is practically along the same line as explained for the manufacture of the aluminum plate. In many instances the master plate molder is confronted with excessive shrinkage due to the design of the article. This may force him to resort to the use of an aluminum chill which is shown in this display.

"The dryer pattern procedure is the same as that followed in the manufacture of the core boxes. Upon completion of this pattern, the foundry makes trial molds which are thoroughly checked by the pattern maker and engineer in charge of this work, and if satisfactory, a form known as 'Distribution of Patterns' is issued which releases the pattern for regular production.

Providing Special Tools

"The Chief Tool Designer in the meantime has authorized the manufacture of the necessary tools and proceeds with the design of the tools and the making of the proper records. The records enable the foreman to make the proper notation on his tool cards, which are referred to in our daily routine and indicate where the tools are kept. For the information of those who may not know, I may say that we have a number

of large tool depositories distributed throughout the plant for the storage of all tools necessary for the mechanical operations in our plant.

Calculating Costs for the Job

“Upon the completion of the patterns and tools, the Cost Department makes a calculation of the cost, which is forwarded to the Plant Manager’s Office for recording on a pattern inventory record or on the tool inventory record for future reference.

“The tools used on this particular device—a mine hanger—are very simple in their construction, nevertheless thought is necessary to produce and design them. Records are then made on our blue prints for future reference. The device is shown held in the hand on the poster “Tested” at the extreme right of the illustration following page 296.

Making Gauges

“It will be noticed that we have gauges for determining the exact size of the thread in our boss castings, in regard to their diameter and length, also the checking of the countersink and the root diameter of the thread. All this checking is necessary in order to guarantee that the customer receives quality goods.

Using Special Equipment

“On account of the enormous quantity of studs used in the manufacture of our insulators, it was found to be more economical to replace the old method of cutting the threads on the stud with a bolt cutting machine, with thread rolling dies and a thread rolling machine. This made a considerable reduction in the cost of producing this stud, which was very necessary on account of the keen competition that we encounter in marketing goods of this nature.

Dies Are Expensive

“The insulating dies that are located on the shelf may give you an idea of how the insulating process is performed.

It may be of interest to note that these dies cost in the neighborhood of \$350.00, which indicates the expense encountered in producing tools that we use daily in our plant.

"Briefly, the insulator casting is placed between two splits that are encased with a casing die. The Dirigo compound used in this hanger is special, and a development of the Ohio Brass Company. This material is heated to the required temperature and placed into the casting that rests in the die. The stud is inserted into the heated ram and placed in the casing and the assembled die unit is then placed between the rams of a sixty ton hydraulic press and forced into the compound to a predetermined depth. It is left to cure for approximately ten minutes which completes the cycle and produces the insulator.

Inspection Data Cards

"The Inspection Data Cards shown on the board indicate the thoroughness with which we record data that govern the proper inspection of our materials with its many details.

Cost and Rate Forms

"At the extreme right of the board you will notice the various forms used by the Cost and Rate Departments, which enable them to collect such information as is necessary, in order to get the proper cost of the materials we manufacture.

Advertising Material

"The catalogue displayed demonstrates a method of advertising that is necessary to get our materials into the hands of our customers. The copy of the advertisement shown here with the word 'Tested' is typical of the method pursued by our Advertising Department to get all our materials and new developments before our customers."

The Sales Engineer Meets the Men

The sales engineer in his appearances before the groups of employes emphasized the value of such educational programs as the one in their plant. He gave a brief description

of his experience as sales engineer in interesting a customer.

He told of a visit to an isolated location in Utah where a mining company was considering the electrification of its transportation system. The sales engineer spent several weeks making a survey and preparing blue prints, gaining at considerable expense of time and energy much information useful to the sales contact. The prospective customer was appreciative of all this but could not decide whether to give the order to the obliging sales engineer or to one of his equally active competitors.

How Coöperation Helped Sales

In his quandary the sales engineer thought of the possible effect of inviting his prospect to visit the factory where the equipment was to be made. A high official consented to make the trip with a view to seeing for himself the relative advantages of the companies competing to serve his needs. When he visited this factory, he saw how everyone coöperated to observe standards of quality and delivery; he observed the evident spirit of understanding and realized the training which entered into the product, and he immediately placed his order with this factory.

Upon this foundation of industrial relations and common information regarding the complex operations of production, this factory has built an unusually comprehensive and effective program of instruction and training. Apprentice training in this plant includes excellent instruction in related subjects as well as shop work, foreman training is carried forward and opportunity is provided for the technical instruction of men in the plant.

While the experience in one plant only has been described, a number of other progressive manufacturers are carrying forward programs that compare favorably with this one, although not all use the same methods. It is a hopeful sign to observe that many managers are under the "conviction that mental and moral forces must be added in a much larger degree to the physical resources now employed if industry is to serve all

who are dependent upon its continuous and effective operation."

INTEREST QUESTIONS

1. What kinds of factory activities may be classed as educational?
2. What are some special difficulties which may be encountered in company loans to employees?
3. Why is a production record a safe basis for company loans to employees?
4. In the absence of such tools as described in this topic, what are the tools of a foreman or plant executive?
5. Sometimes we hear of workmen who say of cafeterias, recreation rooms, and similar devices: "I would rather have the money in my pay check." From a strictly business point of view, which would probably bring the better results?
6. Which of the following firms would be most likely to install lunch rooms, club rooms, pension plans and loan plans: (a) One which pursues methods of scientific management in production, or (b) one which does not follow methods of scientific management in production? Why?
7. (a) What is the difference in the meanings of the following words: Personal and personnel? (b) What significance may this have in industry?
8. Why is paternalism harmful in industry?
9. What are some possible benefits to be derived from workers in different departments knowing something of the work done in other departments?
10. Why do organized inspection tours give better educational results than individual interdepartmental sight-seeing trips?
11. Why is it important to outline our remarks in advance when we have anything important to say?
12. If it were profitable to neglect several of the many forms and records used in the course of producing an article,

An Educational Experiment that pays Dividends

what would be the probable action of progressive company officials regarding their use or disuse?

13. Is it reasonable to assume that economy in production is carefully considered by progressive managers when forms and records are adopted?
14. What is the difference between a sales engineer and a salesman?

READING REFERENCES

1. Belt, Robert E. Foundry Cost Accounting, "Classification and definition of accounts," chapter VII.
2. Carver, Thomas Nixon. The Present Economic Revolution in the United States, "The higher strategy of labor," pages 165-199.
3. Houser, J. David. What the Employer Thinks, Case studies beginning with "A sub-manager," page 55 to include (J) on page 75.
4. Lapp, John A. Economics and the Community, "Distributing the income," pages 131-133.
5. Moxey, Edward P., Jr. Principles of Factory Cost Keeping, "Accounting for indirect expenses," chapter IV.
6. Shearman, Henry P. Practical Economics, pages 293-298.
7. Taussig, F. W. Principles of Economics, vol. I, revised edition, "Market value. Demand and supply," chapter 10.

CHAPTER XXXI

Faith as an Economic Factor— The Economic Value of Education— Selfishness and Greed as Causes of Waste in Industry

Achievement, the Best Recommendation

Occasionally we hear persons bemoaning what seems to them to be unjust discrimination. Some one will complain that "So and So got a job and I didn't simply because So and So has had more schooling."

Those who complain against what they are pleased to call fate are equalled in their capacity for destroying their own opportunities only by those who labor under the delusion that all they need is to collect a number of written recommendations to be assured of jobs and advancement. Formal recommendations are all right provided the recommendation is signed by an unquestionable authority in the field wherein the judgment is exercised. There are so many elements to be considered, however, that it is wise for the young man to offer written recommendations only when they are requested. This is not unusual. Industrial applicants should reflect that a recommendation is worth no more than the performance or known character upon which the recommendation is based.

Recommendations Should Tell What Applicant Can Do

Benjamin Franklin, while in Europe, was asked by some one whom he did not know, to recommend him to Franklin's friends in America. Evidently, Franklin had little knowledge of the productive qualities of the one desiring the recommendation. The following recommendation was given:

"Sir—The bearer of this, who is going to America, presses me to give him a letter of recommendation, though I know nothing of him, not even his name. This may seem extraordinary, but I assure you it is not uncommon here. Some-

times, indeed, one unknown person brings another equally unknown to recommend him; and sometimes they recommend one another! As to this gentlemen, I must refer you to himself for his character and merits, with which he is certainly better acquainted than I can possibly be. I recommend him, however, to those civilities which every stranger, of whom one knows no harm, has a right to; and I request you will do him all the favor that, on further acquaintance, you shall find him to deserve. I have the honor to be, etc.”

Choosing Company and Choosing a Job

Let us assume that two persons desire very much to meet some great man who is in a position to do something for one of them. If one is accompanied by several men who are well known for their achievements in industry and social life and the other goes entirely alone, which one will receive the greater consideration? When a man has studied subjects which are related to industrial and therefore social progress, he is accompanied to the employment office by a host of men and women who one by one, little by little, have added to the sum of human knowledge. Just here arises a thought which has been expressed throughout the ages.

It deserves to be written in letters of fire across the sky that all may read it every day. Goethe stated it as follows: “No productiveness of the highest kind, no remarkable discovery, no great thought which bears fruit and has results, is in the power of any one; but such things are elevated above all earthly control.” The fundamental information upon which mankind depends for advancement is not found only in schools and colleges. If we want it, we may find it. “Ask and ye shall receive” and “Seek and ye shall find” are promises which apply particularly to the gaining of useful information.

Schools and Colleges Are Industrial Conveniences

Schools and colleges are merely convenient places where we may go in search of certain information. They are there for our convenience. Certainly, we should make all possible

use of them; but if we may not continue in school, we may follow the examples of a host of men like Faraday and Lincoln and seek and find information elsewhere. College teachers and research workers who are really leaders of thought, very rarely confine their efforts to their college students. They write and lecture and contribute their trained service to mankind through participation in many activities outside of the training of students in their classrooms and laboratories. Then, too, there are some things which must be learned outside the schoolroom, and these things comprise a great part of the understanding of a well educated man.



Plant library at Eastman Kodak Company, Rochester, N. Y. Many modern factories maintain libraries where workers may continue to acquaint themselves with the works of well-known authors.

Courtesy of Eastman Kodak Company.

Regardless of the sources of one's information, if he studies diligently he will be accompanied to the employment office by a company of distinguished persons whose presence will assure him sincere consideration.

Education Should Not Be Wasted

Some who read these reflections may question how all this

discussion of schoolrooms, culture, and related study may be construed as industrial economy. To these we reply simply that since economy is concerned with the elimination of all possible waste, certainly a consideration of waste of race experience must not be omitted. If we are to become economical, we must first take account of what we may waste. Man is far more wasteful of the accumulated knowledge of past generations than of material things. If we were not wasteful of accumulated knowledge, we should not waste materials, for if there is any one thing which is emphasized in every art and science, it is that waste in any form is the enemy of human progress.

Owners, Managers, and Workers Contribute Information

The accumulation of knowledge which bears upon the details of modern production is staggering in its quantity as a whole. Strange to say, it is at the same time disappointing in its meagerness at many points. The production of rustless steel, the finding of the source of malarial infection, the extraction of aluminum from earths, and many other desirable accomplishments were long delayed for lack of specific knowledge. Industry has developed a comprehensive system for the discovery and development of that which will in time become valued race experience. Technical departments, research laboratories, personnel programs, and individual workers are all engaged in this quest. Any particular item of newly discovered knowledge or race experience may be applied to an industry by owner, manager, or worker.

Investors Originally Had Faith in the Business

There is one thing, however, that the great majority of stockholders or owners bring to industry which is not always as surely brought by employes. We say "the great majority" because it is possible that a very few owners may have their ownership thrust upon them. Most stockholders or owners are such by their own choice and for that reason may be said certainly to bring this peculiar thing with them to

industry. But with employes, possibility replaces certainty. This difference should be of immense interest to anyone who is studying industrial relations with a view to improving industrial practice.

Employes Do Not Always Have Faith in the Business

Investors practically always place their faith in the business in which they invest. But it is entirely possible for an employe to go to work for a company with scarcely any faith in the business save as a very temporary means of earning a living. Such lukewarm expectation should not be classified as faith. "Faith is the substance of things hoped for, the evidence of things not seen."

It is possible for a man to go to work for a company which he seeks to harm. He may have even accepted an anti-social belief in that which is known as sabotage, and so he may endeavor by deliberate "soldiering on the job" and occasional crippling of equipment and waste of materials to cause the company to lose both business and profits. Naturally, such an unsocial person would not get very far in industry. The very fact that every official, every foreman, and all progressive workmen—in short, all normal human beings—are trying to eliminate waste in industry, will assure that such a perverted individual will not go long undiscovered

Lack of Faith More Harmful Than Unsocial Beliefs

There is no intention here of inferring that any considerable part of the harm to industry comes from unsocial employes whose contributions are deliberately limited. On the contrary, it is recognized that much of the industrial unrest which is certainly harmful to industry is a direct result of the exercise of poor judgment upon the part of managers and owners.

Employers and employes alike are subject to the laws of economics. Waste will not remain undiscovered; and when the cause is discovered, be he employer or employe, he suffers the common fate of all antisocial bodies—he is sloughed off the industrial organization unless through a changed mental

attitude he adopts economical practices. In such case, he is as certain to renewal of personal advancement as he is of improving physically and mentally upon improvement of hygienic practices. The worker who has little faith in the beginning has a better chance than the investor who leaves his money in a business after he loses his faith.

The wage earner may continue to draw his wages while having his faith gradually increased, but the alarmed investor may sell his property for whatever an owner can get and later learn that others with more faith have held on and found their investment good.

INTEREST QUESTIONS

1. What special information would be most helpful to one who desires employment as an ordinary laborer? as a technical expert? a manager?
2. What is meant by race experience?
3. What was the schooling of the following persons: James Watt, Michael Faraday, Robert Fulton, Benjamin Franklin, Abraham Lincoln, Thomas A. Edison, Alexander Graham Bell, John D. Rockefeller, Sr., Henry Ford, Orville Wright, Wilbur Wright, Luther Burbank, George Westinghouse, Charles Steinmetz, Frederick W. Taylor, and Charles A. Lindbergh?
4. How did the work of Frederick W. Taylor probably influence the methods of Henry Ford?
5. Why does one who obtains his education outside school-rooms need to read and study much more today in order to succeed than was necessary in the time of James Watt? How does this change affect the school-trained person?
6. Give an example of waste of accumulated knowledge commonly observed in industry.
7. How may our home environment be reflected in industry?
8. How may our industrial environment be reflected in the home?

9. Why is one who seeks to hinder the production or distribution of economic goods said to be unsocial?
10. Why does selfishness cause waste in industry?

READING REFERENCES

1. Burnham, William H. *The Normal Mind*, "Success and failure as conditions of mental health," chapter XV.
2. Carver, Thomas Nixon. *The Present Economic Revolution in the United States*, "The growing financial power of laborers," chapter four.
3. Chapman, J. Crosby, and, Counts, George S. *Principles of Education*, "What methods should control the conduct of instruction?" problem 23.
4. Dewey, John. *Democracy and Education*, "The nature of subject matter," chapter XIV.
5. Dorsey, George A. *Why We Behave Like Human Beings*, page 362; first three paragraphs on page 363.
6. Durant, Will. *The Story of Philosophy*, "European philosophers," beginning with second paragraph, page 525 and including first two on page 526.
7. Lapp, John A. *Economics and the Community*, "Social control," chapter XXII.
8. Shearman, Henry P. *Practical Economics*, "Education and training," pages 346-348.
9. Van Dyke, Henry. *Ships and Havens*, "The haven of work," pages 18-36.

CHAPTER XXXII

The Economic Value of Industrial Friendship— Faith in Men Necessary to Friendship

Man's Great Achievements

1. The Use of Fire

Through the ages, three great achievements have marked the progress of the race. The first was the use of fire; the second, the construction of the continuous lever or wheel; and the third, the use of heat through steam as a source of power. Fire, the materials with which to construct the wheel, and heat-laden steam had been known to man for thousands of centuries before they were used to serve mankind.

Millions of men had watched the sparks fly as stone struck stone before some one saw the tiny flame rise from the dry grass where the spark had flashed and thought to use the flame. For ages perhaps, a plaything to amuse the childish fancy, the sparks of fire came at last to be the greatest source of power in offense and defense and served to cook the food of wandering tribes of prehistoric men.

2. The Continuous Lever or Wheel

Countless men had bent the long limbs of trees to form the hoops that held in place the skins or boughs which sheltered man in ancient times. Doubtless, children of our tribal parents rolled hoops of twisted willow made in childish imitation of their elders' work. No one knows how long these hoops were formed before the hub and spokes were made to complete the continuous lever or wheel which has made possible the development of intricate machinery.

3. The Use of Steam

Hundreds of centuries after fire had come into general use for cooking food and after the wheel had been made in many forms, James Watt found that fire could be used to produce

steam to turn the wheels of machinery. All power is and has been with us always, and there is no more and no less energy in the world today than when the first man peered through the misty dawn of Earth's first day.

Fire, machinery, and energy of heat harnessed with iron bands to do man's will, are but dwarfs beside a fourth giant force which through the ages has been ready to lend its mighty power to man. As in the case of fire, the hoops of bended boughs and the jets of vapor which rose from the steaming kettles, this fourth great power has been at once the plaything of dreamers and the subject of serious application by men and women who have sensed its usefulness.

Man's Next Great Achievement—Coöperation

The fourth power for man's advancement is the power of friendship applied through coöperation in the production and distribution of the fundamentals of life.

Coöperation is to friendship as James Watt's engine was to steam; faith is to friendship what fire is to steam. Without fire, steam could not have been produced; and without faith in men, friendship is impossible. Without steam or other form of energy, the strongest locomotive is powerless to move even its own weight; without friendship, coöperation becomes an empty phrase which may be likened to the whited sepulchres which, though beautiful outside, are full of dead men's bones.

Friendship—A Force To Be Applied

There is no phrase so dead as that which, containing words about growth, yet falls flat in the face of the realities of life. Not words, but rather activities essential to life can apply the force within friendship. Leaders in all times have been men whose friendship for their followers inspired faith and made them sharers in a common effort.

Many excellent persons reject all suggestions of friendship, especially in business relations, because, like other virtues, friendship has sometimes been abused by emotionally imaginative persons who believe that to be a friend one must practice

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certain familiarities, such as calling one by his Christian name or even by some more intimate salutation. With these persons, the existence of friendship is proved when one man slaps another on the back and calls him "brother" in tones of solicitation and intimate sympathy. There are some natures to whom such contact is disgusting and unbearably offensive. These reserved persons are frequently capable of the deepest feelings of human sympathy and are ever ready to reflect in all their acts the most devoted friendship. To persons of reserved temperament, familiarity does indeed breed contempt!

Familiarity Opposed to Friendship

Familiarity may be defined differently in detail by different people. There is no question, however, as to that which is considered familiarity producing emotions quite distinct from those aroused by friendship.

Friendship in its truest sense is the condition of continually being of mutual service. Friendship like love "suffereth long and is kind, envieth not, vaunteth not itself, is not puffed up and doth not behave itself unseemly."

Men who value real friendship should not allow the familiarity of less poised persons to blind them to the dynamic energy concealed within the hearts of the calm men who always ring true. He is profane, indeed, who reduces friendship to the level of a noisy greeting or who is prompted by self-interest in his use of friendly terms.

Hypocrisy Destroys Friendship

The great Roman orator, Cicero, offered wise counsel to those who would retain friendships:

"As, therefore, both to give and to receive advice is the characteristic of true friendship, and that the one should perform his part with freedom but not harshly, and the other should receive it patiently and not with recrimination; so it should be considered that there is no greater bane to friendship than adulation, fawning, and flattery. For this vice should be branded under as many names as possible, being

that of worthless and designing men, who say everything with a view of pleasing, and nothing with regard to truth. Now while hypocrisy in all things is blamable (for it does away with all judgment of truth, and adulterates truth itself), so especially is it repugnant to friendship, for it destroys all truth, without which the name of friendship can avail nothing. For since the power of friendship consists in this, that one soul is as it were made of many, how could that take place if there should not be in any one a soul, one and the same always, but fickle, changeable, and manifold? For what can be so pliant, so inconsistent, as the soul of that man, who veers not only to the feelings and wishes, but even to the look and very nod of another."

History Reflected in Present-Day Problems

Every age has produced its leaders, like Cicero, Socrates, and Napoleon; and the work for them to do. The beginning of the eighteenth century saw in many lands the assembly of greater concourses than ever before of men and women whose lives were dedicated to governmental reform. We pause in wonder sometimes at the spectacle of the assembly in one group of such intellectual giants as Washington, Jefferson, Franklin, John and Samuel Adams, Hamilton, Hancock, and others. Thrown together in leadership at a time when the whole world was a laboratory of governmental science, in a young and isolated country where agricultural problems did not wholly occupy the mind, these men dreamed and thought and talked government until they brought before the world a new nation whose basic laws are the marvel of social codes.

The great problem of today is industrial coöperation. It lives in the minds of men wherever the hum of factories reminds us of the toiling millions who should live and work in peace and happiness.

Everywhere today, groups of men whose time is hard won from the work of feeding, clothing, and sheltering the race are earnestly discussing methods of obtaining coöperation.



A G-E Apprentice Association and Alumni picnic. When training is combined with happy associations, it is all the more effective. Courtesy of General Electric Company.

Since the distant stars of Judea looked down upon the shepherds listening to the exalting strains of "Peace on Earth, Good Will to Men," there has never been a time more pregnant with possibilities for this achievement than the present moment.

Coöperation in Production—The Great Objective

Humanity stands today upon the verge of great achievement. Through the changing years of hoary centuries, the spirit of coöperation has been waiting to be released. When men lived in caves on the sides of cliffs, it was not time to bring forth this great achievement in all the glory of its full service. It was as though an All-seeing Mind looked down the aisles of time and saw through fire and moving wheels and clouds of hissing steam, this day of far flung cities and great factories where men, toiling side by side, must some day learn to love their neighbor on the job as well as near their homes. Nations with outgrown borders, trampling down traditions, being jostled in their markets, fall to fighting. Nations, workers, employers—all are seeking the spirit of coöperation.

Some there are today, as in all ages, content to wait for an unseen power to change the world in the twinkling of an eye from restless discontent to eager helpfulness. Such are doomed to disappointment as is proved by the race's experience in the use of fire and machinery and steam.

Coöperation Cannot Be Enforced

Humanity gains control of forces by many human efforts, not by miracles or by laws of men. It is not in the halls of legislatures that coöperation will be achieved. No law can be enacted to compel men to have faith in other men. No act of Congress can set up friendships where friendship does not now exist.

Neither can we hope for this great human development to issue from the schools and colleges, the lecture platforms or the printed page. No college, however renowned for learning,

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can of itself teach men faith or friendship for their fellow men. No orator or writer, whatever his vision and his magnetism, can bring to pass the miracle of transforming distrust into confidence.

Faith and friendship are produced and tested in the fiery furnace of daily activity in this age where men are working together to supply the common needs of all. It is here, from the mills, mines, stores, and factories; from the classrooms and the offices in so far as these are an integral part of the ever growing life stream of the age, that will come the glad announcement of the achievement of coöperation.

We stand today with eagerness upon the doorstep of opportunity and wait for the James Watt of human relations to direct the power of friendship into the silent giant engine of coöperation.

Coöperation is the crowning achievement of the race. To those who look with awe upon the order of all growth, there is inspiring grandeur in the progress from the use of fire, through the invention of machinery, to the use of steam which at last has brought the world to an era of production wherein the need for coöperation is recognized on every hand.

Industry Is Searching for a Formula

Industry is searching; and men in industry are dreaming, thinking, talking, and experimenting regarding the development of the man factor. The orderly arrangement in these experiments in industrial relations reminds us of the progress of all human development.

Welfare work, with its loans, sick benefits and burial funds, all of which were designed chiefly to relieve distress, has been replaced by the service departments whose chief aim has been to stimulate interest in the job. These departments have added to the welfare activities such activities as lunch rooms, shower baths, lockers, picnics, games, publications, pension plans, dispensary and hospital service, nursing service, group insurance, home ownership, coöperative stores, and safety programs. The service department has in turn been

succeeded by the personnel department which, while retaining at least in principle the activities of the welfare and service departments, has specialized in employment and placement of workers; has planned incentives to stimulate production, worker education, employe training and foreman training; and has supervised compensation, rate adjustments, and similar enterprises.

Men Cannot Be Made Better by Enacting Laws

No greater mistake can be made than to suppose that men and women can be made better by the strict enforcement of laws and rules of conduct. No law or rule has ever been devised which has compelled men to be good at heart. The Sermon on the Mount sets up the highest ideal of individual human character. These great principles have been known to nearly all the lawmakers of modern times and to countless others; yet not one of the beatitudes has been adopted as a law to be enforced.

"Blessed are the poor in spirit" does not lend itself readily to enactment as law. "Blessed are the meek" does not suggest that a law be passed by Congress compelling all to be meek. "Blessed are they that hunger and thirst after righteousness" does not inspire our legislative bodies to pass a law enforcing hunger or thirst even after righteousness. "Blessed are the merciful" has never inspired a lawmaker to propose a law to compel citizens to be merciful. Who would be so bold as to enact a law to require all persons to be "pure in heart" or to be "peacemakers?" In every age, men and women have been "persecuted for righteousness sake," yet no law has required such persecution. Neither is it possible to coördinate people in loving their neighbors as themselves.

These active principles of the great beatitudes of Jesus enunciated in the Sermon on the Mount are quite incapable of expression in law for the simple reason that they are virtues which are such only when endorsed and freely practiced by individuals.

These greater human virtues lie in that region beyond the

limits of coördination—beyond the effect of rules and laws. Coördination fails at this point where our better natures assert themselves. Men and women cannot be made to add to their faith, to their virtue or knowledge or finally to their brotherly kindness. All of the finest traits of character are developed through voluntary action of the individual. Shops and factories cannot enforce rules requiring men to have faith in fellow workmen. The smooth grain of strong character is a direct result of a well-balanced mind and an earnest desire upon the part of an individual to see both sides of all questions while lending a willing hand to help the other one. Some day more managers of factories and workers will learn simple rules of psychology as they affect the actions of men.

Human Interest Should Guide Personnel Work

The gravitation from personal interest to personnel or group interest has at last compelled the attention of industrial leaders and has led directly to earnest consideration of methods for promoting coöperation among individuals. Elaborate machinery for promoting personnel activities has been set up in many factories and businesses, and yet there remain in some of these plants all the evidences of industrial unrest. Occasionally in other industries where there is no organized welfare work, no service department, and no personnel department, there is evidence on every hand of happiness and contentment. These apparent contradictions have challenged the attention of thoughtful industrial leaders and workers.

What Will Stimulate Mutual Interest?

Every interested person has begun to ask himself, "What makes workers happy and content? What makes a factory an agreeable place to work in?" Certainly, all agree that every worker is entitled to work where conditions are agreeable. Agreeable conditions produce a general atmosphere of agreeableness. In this atmosphere men are happy. Happy men and women working together have always coöperated. How then may the men and women of industry be made

happy? We must not make the mistake so commonly made by students of industrial relations of considering happiness merely from the standpoint of workers. An unhappy manager or other executive cannot but reflect unhappiness. To neglect this very important detail is certain to lead to industrial misunderstanding.

Happiness Is a Mental Attitude

Happiness is not a physical condition. Happiness is a state of mind. This is the supreme lesson which only experience can bring to men. Relief from worry and physical health certainly are aids to happiness, but alone they cannot produce it. Worry and ill health are frequently the results of unhappiness rather than its causes. Happiness is a mental attitude which arises from our faith in progress and in friends. To have faith in progress we must, it is true, be fairly free from worry and enjoy some degree of physical health; but faith means more than freedom from ills.

Friendship Depends on Community of Interests

If one can glimpse the rainbow of hope through the shifting clouds of material hardships, he is assured that the sun of opportunity will soon be shining across the path of life. If a person has even one true friend who understands and trusts him, and if he can raise his eyes and see the goal of an unselfish hope, he may yet be happy, although all the rest of the world has turned aside. Men must have friends, and there can be no true friendship without a community of interests. Men must have faith in other men that each will do his part toward the common goal. These are fundamentally necessary to happiness. These are the essentials of agreeableness where men are daily associated in the production and distribution of the fundamentals of life.

Friendship Comes through Faith in Men

Faith comes of understanding; and without consistent study of men as men, this understanding is impossible. Friendship is based on faith in men and women; and without this



Universal Portland Cement Company's employees' picnic. Faith and friendship begun in the factory may be strengthened through social contact. Courtesy of Universal Portland Cement Company.

faith, friendship is as impossible to men as is steam without the fire.

How then may we gain and increase our faith in men? The answer is so simple that those who have thought themselves wise will reject this rule while searching for a formula which involves more scientific calculation. Simple conclusions are usually more difficult because we try to reach them through the complex mental mirages of our preconceived opinions. Faith comes through understanding. If faith in men comes by understanding men, then our fundamental activity in human relations should be the sympathetic observation of our fellow men.

Mankind's Greatest Study

How should we observe men in order to form friendships? First, we must start right. Starting right in forming friendships is a matter of deciding what to look for. We must look for the good in men—that good which is leading them toward the goal of common interests. The evil men do is well advertised. The good men do should be made the subject of earnest search. Every associate should be our research project and our problem should be to find the good within the man's life. This is his motive power, even though he does not know it. Our recognition of this power in others increases our own force in human relations. Sincerity, honesty, thoughtfulness of the comfort of others, coöperativeness, kindness, job pride, self-respect, energy, unselfishness, and sobriety of judgment are some of the many characteristics to be the objects of research.

Human Research Is Needed

Such research will lead to an understanding faith in deserving associates and will lead us to feel the emotion of friendliness which is half of friendship. From thence coöperation, the direction of the forces of friendship, is assured.

All this brings us to the consideration of the present means in industry for prosecuting the study of human beings as such. Industrial managements have proved the wisdom of the

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establishment of welfare, service, and finally personnel departments. These have come to stay as arms of management. They cannot, however, suddenly reverse their tendencies and focus their attention upon the individual as they should in time. Personnel or group departments cannot overnight



Committee on Employees' Transportation, Housing, Domestic Economics, Living Conditions of Industry, Education and Publication, Continuous Employment and Conditions of Industry of the Bethlehem Steel Company. These men must have open minds and render decisions in the light of understanding if mutual benefits are to accrue. Courtesy of Bethlehem Steel Company, Bethlehem, Pennsylvania.

become personal or individual in their function. Although this is true, we should go constantly forward toward the goal of individual coöperation which is the inevitable achievement of this industrial age.

We must begin the study of men as men. If we are to bring about an atmosphere of agreeableness in industry based on faith and understanding, we must consider the human qualities of every human being in industry.

Human engineering should be developed as a scientific study. We must study man as a biological and social unit

and in doing this we shall find the reasons for his actions. We must devote the same attention to the human factor as we now devote to the materials and equipment factors.

Human Engineering, an Industrial Subject

The direct purpose of this scientific study of the man factor should not be to bring about coöperation. Let us not deceive ourselves—friendship cannot be won by scientific investigation. Friendship is an attitude. Coöperation is at once its expression and its cause. If we are to form friendships, we must do those things which are recognized as coöperative. The aim of the study should be to learn best how to coöperate freely. Human engineering should aid us in our understanding of the motive forces for good within man, and over all should be the simple faith in man which is the fundamental basis of all friendships and the potential power of coöperation.

Human engineering will take its place in the not distant future among the professions. When that time comes, men will not be graduated from college with the expectation of soon achieving an executive position in industry without previously having completed a pre-executive course in Human Engineering. Psychology and sociology will then become subjects of greater appreciation by industrial leaders. They will cease to be tolerated by some as unarticulated parts of an ununderstandable educational device which is supposed to function in some mysterious manner in modern industry.

In our new industrial day, we shall see the coming of that superpower of human fellowship which will transform our factories into wonder shops of happiness where the atmosphere of agreeableness is ever present and where we all shall work together for joy in the production of the fundamentals of life.

INTEREST QUESTIONS

1. Why do we sometimes hear men say that they prefer not to have friends working for them?
2. What is a friend?
3. What constitutes undue familiarity?

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4. How would you go about it to win the friendship of an acquaintance?
5. Why does the recognition of a problem lead toward achievement?
6. What is the relation between industrial coöperation and international peace?
7. Is it easier to achieve coöperation in industry today than in the days of James Watt? Why?
8. What subjects in grade and high schools best prepare students to understand future fellow workers?
9. When may loans by employers to employes be detrimental to the interests of the business? When helpful? Give reasons.
10. To what extent should industries promote hospital, dispensary, dental, and nursing service?
11. What are some benefits to be derived from company operated lunch rooms?
12. What trades or industries should operate bath rooms for employes?
13. Suggest a method for developing in employes and employers increased faith in one another.

READING REFERENCES

1. Barton, Bruce. *The Man Nobody Knows*, "His method," chapter IV.
2. Hall, E. K. *The Personnel Job*, "Two schools in personnel work," pages 10-15. Published as a Convention Address by the American Management Association, 1922.
3. Lewisohn, Sam A. *The New Leadership in Industry*, "Impersonal relationships," pages 33-38; "Sabotage," pages 38-40; "Exploitation," pages 41-43.
4. McClure's Magazine, June, 1925, "A single speech made Stanley Baldwin famous," pages 120-124.
5. Morris, Joseph, and, Adams, St. Clair. *A Little Book of*

- Friendship—"The Wreck of Friendship" by Hugh Black, pages 116-119.
6. Slosson, Edwin E. Creative Chemistry, "Three periods of progress," chapter I.
 7. Smith, Adam. The Wealth of Nations, vol. II, second edition, edited by Edwin Cannan, "Of the expense of the institutions for the education of youth," article II, pages 249-273. (This reference is suggested only for comparative reading by those who are interested in tracing conclusions.)
 8. Taussig, F. W. Principles of Economics, vol. I, revised edition, "Financial panics," sections 5 and 6, pages 423-426.
 9. Taussig, F. W. Principles of Economics, vol. II, revised edition, "The utilitarian reasoning . . ." pages 252-254.

BOOKS USED AS REFERENCES

- American Engineering Council. *Waste in Industry*. McGraw-Hill Book Company, 1921.
- Barnes, Julius H. *The Genius of American Business*. Doubleday, Doran and Company, 1924.
- Barton, Bruce. *The Man Nobody Knows*. The Bobbs-Merrill Company, 1925.
- Belt, Robert E. *Foundry Cost Accounting, 1919*. (Cleveland, Ohio.)
- Bloomfield, Daniel. *Financial Incentives for Employees and Executives*. Volume I. The H. W. Wilson Company, 1923.
- Brookings, Robert S. *Industrial Ownership*. The Macmillan Company, 1925.
- Brownell, Herbert. *General Science*. P. Blakiston's Son & Co., 1918.
- Burch, Henry Reed, and, Patterson, S. Howard. *Problems of American Democracy*. The Macmillan Company, 1922.
- Burnham, William H. *The Normal Mind*. D. Appleton and Company, 1925.
- Caldwell, Otis W., and, Slosson, Edwin E. *Science Remaking the World*. Garden City Publishing Company, 1927.
- Carver, Thomas Nixon. *The Present Economic Revolution in the United States*. Little, Brown, and Company, 1926.
- Chapman, J. Crosby, and, Counts, George S. *Principles of Education*. Houghton Mifflin Company, 1924.
- Chase, Stuart. *The Tragedy of Waste*. Workers Education Bureau of America, 1926.
- Chase, Stuart, and, Schlink, F. J. *Your Money's Worth*. The Macmillan Company, 1927.
- Child, Richard Washburn. *Battling the Criminal*. Doubleday, Doran and Company, 1925.
- Conrad, Joseph. *Youth*. Doubleday, Doran and Company, 1925.
- Cowdrick, Edward S. *Manpower in Industry*. Henry Holt and Company, 1924.
- Dewey, John. *Democracy and Education*. The Macmillan Company, 1917.
- Dewey, John. *How We Think*. D. C. Heath and Company, 1910.
- Dewey, John. *Human Nature and Conduct*. Henry Holt and Company, 1922.
- Dewey, John. *Moral Principles in Education*. Houghton Mifflin Company, 1909.
- Dorsey, George A. *Why We Behave Like Human Beings*. Harper and Brothers, 1925.
- Dreiser, Theodore. *Free and Other Stories*. The Modern Library, 1918.
- Durant, Will. *The Story of Philosophy*. Simon and Schuster, 1926.
- Emerson, Harrington. *Efficiency*. The Engineering Magazine Company, 1919.
- Emerson, Ralph Waldo. *Essays*. Oxford University Press.
- Everitt, Frank, and, Heywood, Johnson. *Cost Control for Foundries*. McGraw-Hill Book Company, Inc., 1923.
- Firestone, Harvey S., and, Crowther, Samuel. *Men and Rubber*. Doubleday, Doran and Company, 1926.
- Florence, P. Sargent. *Economics and Human Behavior*. W. W. Norton and Company, Inc., 1927.
- Ford, Henry, and, Crowther, Samuel. *My Life and Work*. Garden City Publishing Company, Inc., 1922.

- Ford, Henry, and, Crowther, Samuel. *Today and Tomorrow*. Doubleday, Doran and Company, 1926.
- Franklin, Benjamin. *Autobiography*. Garden City Publishing Company, Inc., 1916.
- Hadley, Arthur Twining. *Economic Problems of Democracy*. The Macmillan Company, 1923.
- Hamilton, Walton, and, May, Stacy. *The Control of Wages*. The Macmillan Company, 1927.
- Houser, J. David. *What the Employer Thinks*. Harvard University Press, 1927.
- Hughes, R. O. *Economic Civics*. Allyn and Bacon, 1921.
- Hurley, Edward N. *Awakening of Business*. Doubleday, Doran and Company, 1917.
- Kilpatrick, William Heard. *Source Book in the Philosophy of Education*. The Macmillan Company, 1923.
- James, William. *Talks to Teachers*. Henry Holt and Company, 1923.
- Jewett, Frances Gulick. *The Body at Work*. Ginn and Company, 1909.
- Jewett, Frances Gulick. *Control of Body and Mind*. Ginn and Company, 1908.
- Johnson, Joseph French. *We and Our Work*. The American Viewpoint Society, Inc., 1923.
- Lapp, John A. *Economics and the Community*. The Century Company, 1926.
- Lewisohn, Sam A. *The New Leadership in Industry*. E. P. Dutton and Company, 1926.
- Lincoln, Edmond E. *Steps in Industry*. The Macmillan Company, 1926.
- Lindbergh, Charles A. *We*. G. P. Putnam's Sons, 1927.
- Litchfield, Paul W. *The Industrial Republic*. Houghton Mifflin Company, 1920.
- Lodge, Sir Oliver. *Pioneers of Science*. Macmillan and Company, Limited, London, 1926.
- Morris, Joseph, and, Adams, St. Clair. *A Little Book of Friendship*. George Sully and Company, 1925.
- Moxey, Edward P. Jr. *Principles of Factory Cost Keeping*. The Ronald Press Company, 1922.
- Myers, Charles, S. *Mind and Work*. G. P. Putnam's Sons, 1921.
- Osler, William. *A Way of Life*. Norman, Remington Company, 1923.
- Robinson, James Harvey. *The Humanizing of Knowledge*. George H. Doran Company, 1926.
- Robinson, James Harvey. *The Mind in the Making*. Harper and Brothers, 1921.
- Ruskin, John. *Ruskin's Views of Social Justice*. Vanguard Press, Inc. 1926.
- Russell, Bertrand. *Selected Papers*. The Modern Library, 1927.
- Selekman, Ben M. *Employees' Representation in Steel Works*. Russell Sage Foundation, 1924.
- Selekman, Ben M., and, Van Kleeck, Mary. *Employees' Representation in Coal Mines*. Russell Sage Foundation, 1924.
- Shaw Company, A. W. *Handling Men*. 1917.
- Shearman, Henry P. *Practical Economics*. McGraw-Hill Book Company, Inc., 1922.
- Slosson, Edwin E. *Chats on Science*. The Century Company, 1924.
- Slosson, Edwin E. *Creative Chemistry*. The Century Company, 1920.
- Slosson, Edwin E. *Sermons of a Chemist*. Harcourt Brace & Co., 1925.
- Smith, Adam. *The Wealth of Nations*. Volume II. Methuen and Company, Limited, London, 1920. (Edited by Edwin Cannan.)
- Smith, Henry Louis. *Your Biggest Job, School or Business*. D. Appleton and Company, 1922.

- Smith, J. Russell. *Commerce and Industry*. Henry Holt and Company, 1920.
- Snow, A. J. *Psychology in Business Relations*. A. W. Shaw Company, 1925.
- Spring, LaVerne W. *Non-Technical Chats on Iron and Steel*, second edition, Frederick A. Stokes Company, 1927.
- Taussig, F. W. *Principles of Economics*. Volume I, second edition revised, The Macmillan Company, 1916.
- Taussig, F. W. *Principles of Economics*. Volume II, second edition revised, The Macmillan Company, 1915.
- Taylor, F. W. *Shop Management*. Harper and Brothers, 1911.
- Tead, Ordway. *Instincts in Industry*. Houghton Mifflin Company, 1918.
- Van Dyke, Henry. *Ships and Havens*. Thomas Y. Crowell Company, 1897.
- Watson, John B. *Psychology from the Standpoint of a Behaviorist*. J. B. Lippincott Company, 1919.
- Wiggam, Albert Edward. *The New Decalogue of Science*. Garden City Publishing Company, Inc., 1925.
- Wilson, Woodrow. *When a Man Comes to Himself*. Harper and Brothers, 1915.
- Wood, Charles W. *The Myth of the Individual*. The John Day Company, 1927.

MAGAZINES, BOOKLETS, ETC.

- The Atlantic Monthly, February, 1927.
- McClure's Magazine, June, 1925.
- Beatty, A. J. *Economics for Employees*. American Management Association, 1924.
- Hall, E. K. *Management's Responsibility for and Opportunities in the Personnel Job*. American Management Association, 1922. (November, 9).
- Sheldon, E. E. *American Management Review*. Volume XIV, number 5. May, 1925. American Management Association.
- Frankel, Lee K. *Health of the Worker*. Funk and Wagnalls Company, 1924.
- Frigidaire Corporation, *You and Your Work*, 1927.
- Slosson, Edwin E. *The Physical Sciences*. American Library Association, 1926.
- Bennett, Jesse Lee. *Frontiers of Knowledge*. American Library Association, 1925.
- United States Department of Commerce. *Elimination of Waste—Simplified Practice*. Government Printing Office, 1924.

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- Bloomfield, Daniel, Financial Incentives for Employees and Executives, Volume I, 118.
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